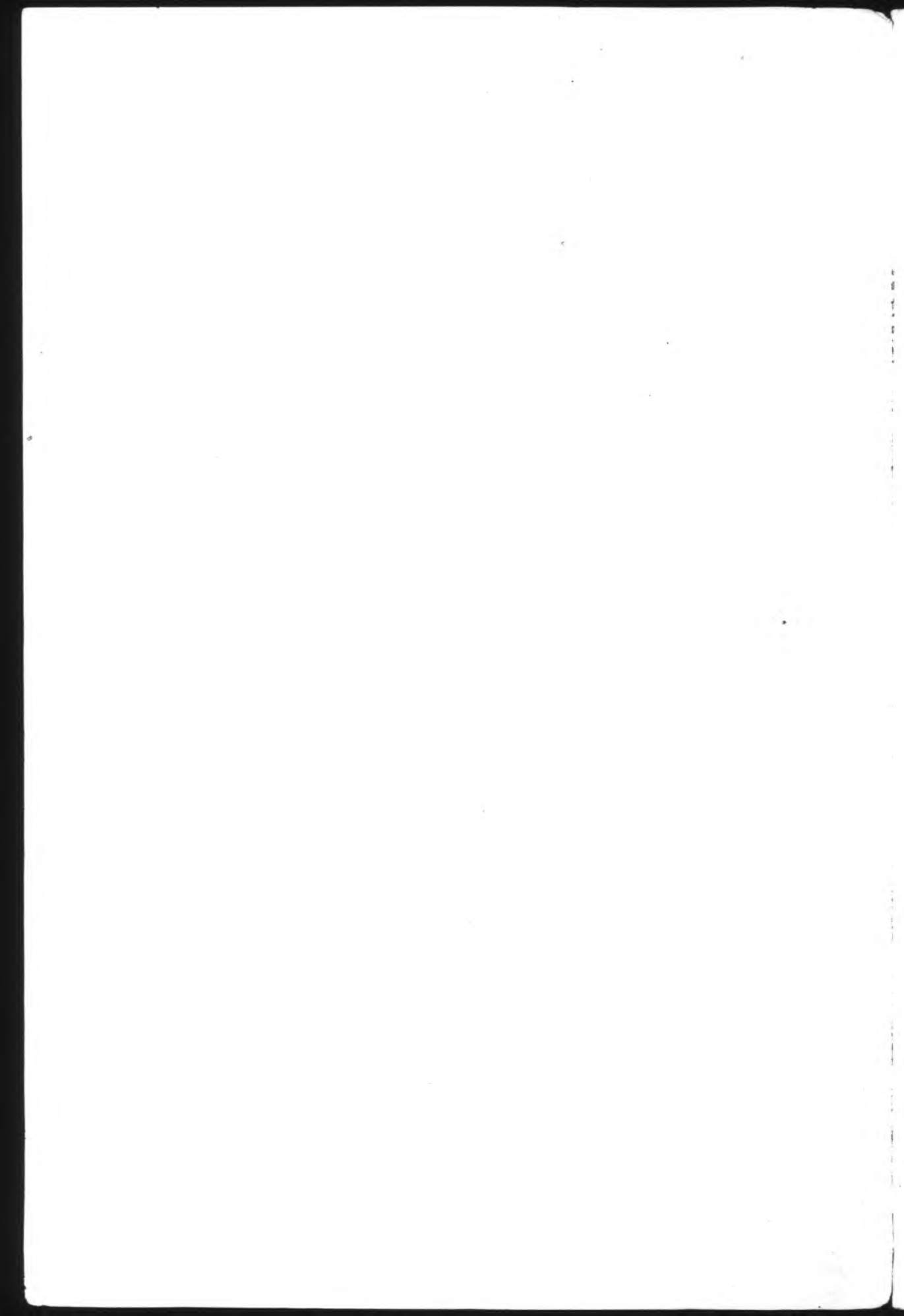


BIENNIAL REPORT  
*Florida*  
GAME & FRESH WATER FISH  
COMMISSION  
1949-50



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BIENNIAL REPORT  
*Florida*  
GAME  
& FRESH WATER FISH  
COMMISSION



BIENNIUM ENDING DECEMBER 31, 1950



**LOUIS G. MORRIS**  
Commissioner



**CECIL M. WEBB**  
Chairman



**D. C. JONES**  
Commissioner



**COLEMAN NEWMAN**  
Commission Director



**BEN McLAUHLIN**  
Ass't Director



**M. C. LEWIS**  
Commissioner



**MILLER V. JOINER**  
Commissioner





COLEMAN NEWMAN  
DIRECTOR

## Game and Fresh Water Fish Commission

TALLAHASSEE, FLORIDA

31 December 1950

### COMMISSION MEMBERS

CECIL M. WEBB, CHAIRMAN  
TAMPA, FIRST DISTRICT  
MILLER V. JOINER, JACKSONVILLE  
SECOND DISTRICT  
LOUIS G. MORRIS, MONTICELLO  
THIRD DISTRICT  
D. C. JONES, NAPLES  
FOURTH DISTRICT  
M. C. LEWIS, ORLANDO  
FIFTH DISTRICT  
JOHN O. JACKSON, JACKSONVILLE  
ATTORNEY

Honorable Fuller Warren  
Governor of Florida  
State Capitol  
Tallahassee, Florida

Dear Governor Warren:

Herewith is submitted the biennial report of the State Game and Fresh Water Fish Commission for the period ending December 31, 1950.

Through this letter and report we wish to express to you, to members of the State Legislature, and to the Public, appreciation for the interest and vision which make possible continued achievement in the conservation of Florida's fish and wildlife.

Respectfully submitted,

Cecil M. Webb, Chairman

CMW/ak

**"Read FLORIDA WILDLIFE—Florida's OWN Outdoor Magazine"**

The People of the State of Florida

Governor

Game & Fresh Water Fish Commissior  
FIVE MEMBERS

Director

Assistant Director

General Administration



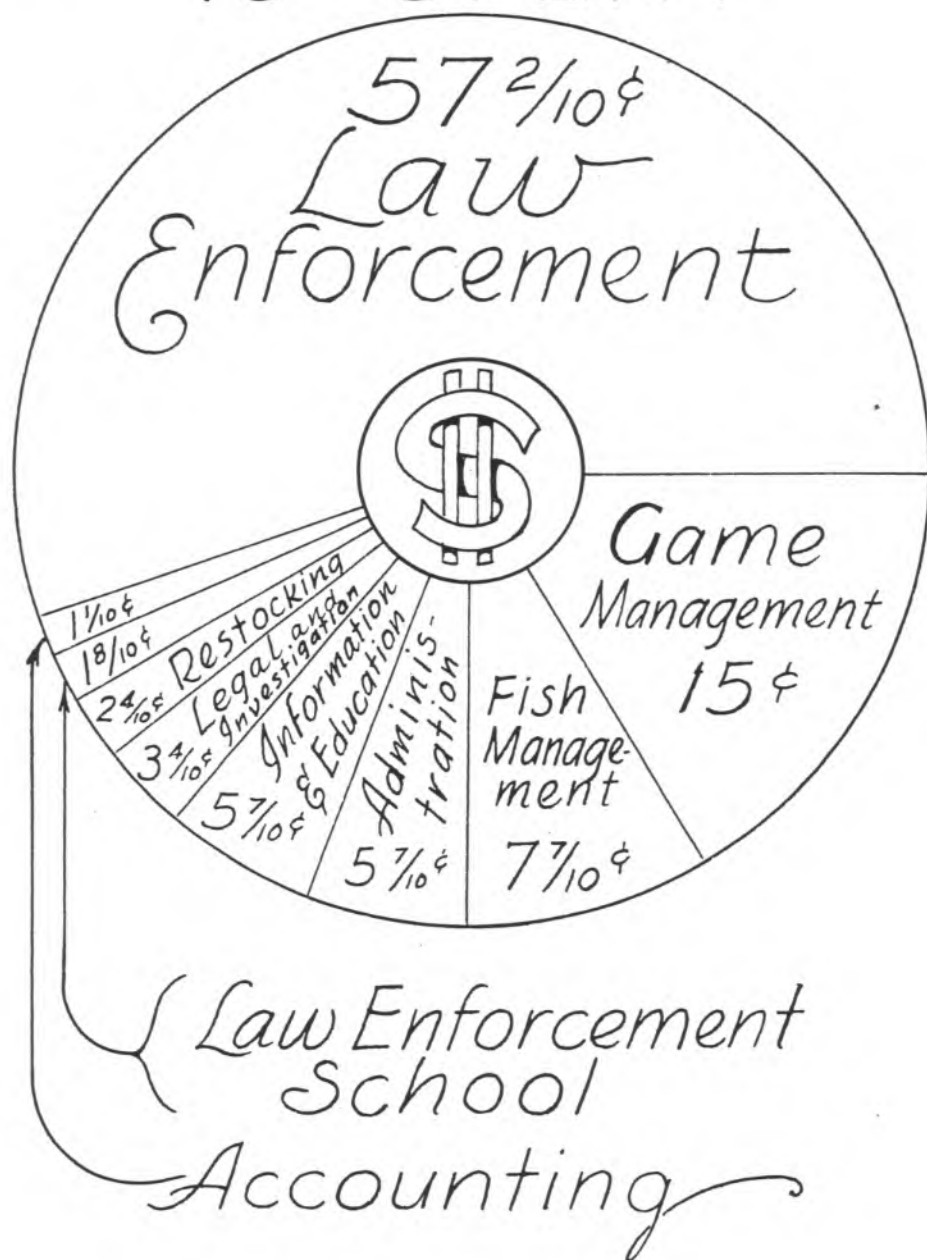
*The*  
COMMISSION'S  
REPORT



COLEMAN NEWMAN  
*Director*

BEN McLAUCHLIN  
*Assistant Director*

# HOW FLORIDA'S Conservation Dollar IS SPENT



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## GENERAL ACTIVITIES

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**D**URING 1949-50, the Game and Fresh Water Fish Commission made definite progress in all phases of conservation work. In general, the Commission has devoted its time to a continued expansion of activities and a streamlining of its methods of procedure.

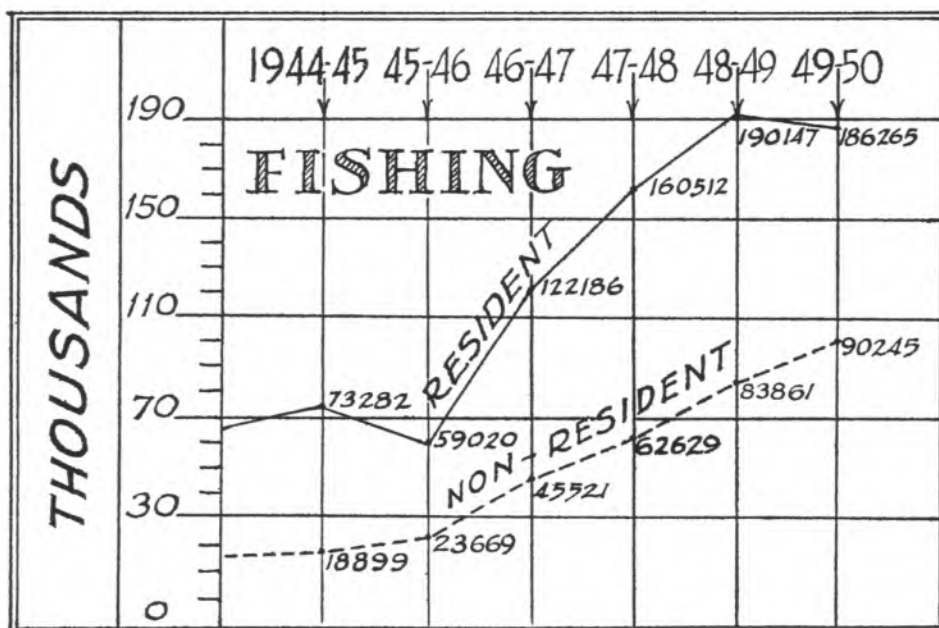
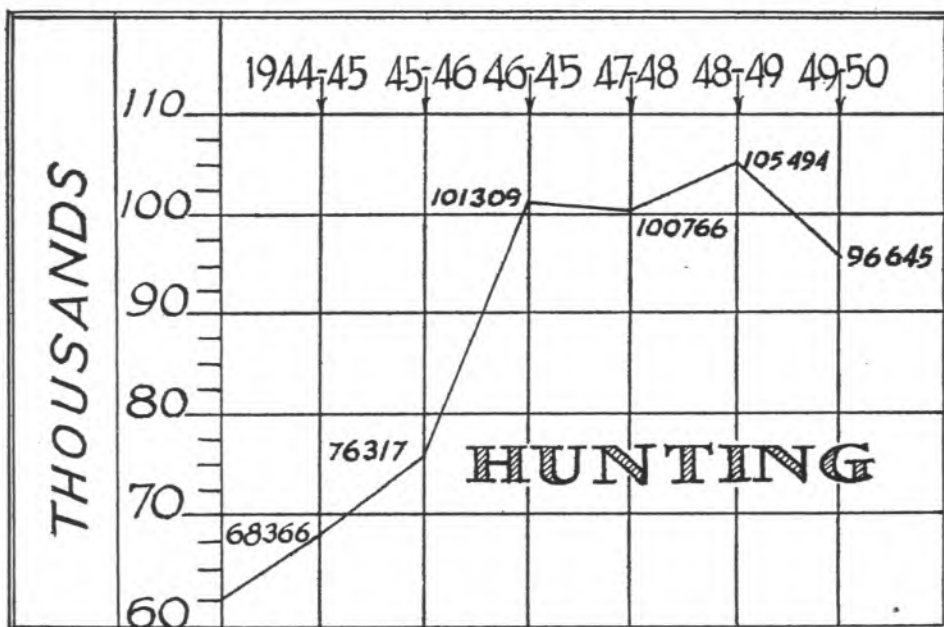
Purchase of permanent quarters for the Tallahassee office of the Commission was probably one of the outstanding improvements of the biennium. With its own building, located at 307 East Lafayette Street, Tallahassee, the Commission has been able to consolidate its office activities, with a resulting increase in efficiency.

The Tallahassee office building, incidentally, was named the "Ben C. Morgan Building" in honor of the late Ben C. Morgan, Director, who passed away in March, 1949, while in performance of his duties. The death of Morgan, who was credited with being an enthusiastic, capable and tireless worker for conservation in all of its many phases, was received with shock and sadness by conservationists and sportsmen throughout the state.

Coleman Newman, assistant director under Morgan, succeeded Morgan in the position of director.

In game management, the biennium was marked by continued progress, including the purchase of lands opened to public hunting, and acquisition of public hunting rights to private lands. The Game Management Division has also devoted its energies to making surveys, investigations and inventories of wildlife in the state. This work, of course, was in addition to the normal management work of the biennium, which included such varied activities as the trapping of quail (7,500 in 1949 and 8,500 in 1950), for release in over-shot areas; the purchase out-of-state and release in Florida of 639 Wisconsin deer and 144 Texas deer, and the trapping and release in underpopulated areas of 224 wild turkeys.

In the Fish Management Division, outstanding work was done in undertaking the initial phase of a survey of the St. Johns River and Lake Okeechobee fisheries. This survey is still in progress and initial reports have been ade. Since January, 1950, the Division has also made a special effort to obtain complete records of all fresh water fish taken by commercial fishermen, as required by the Statutes of Florida. Data received is believed to be more than 90 percent complete.

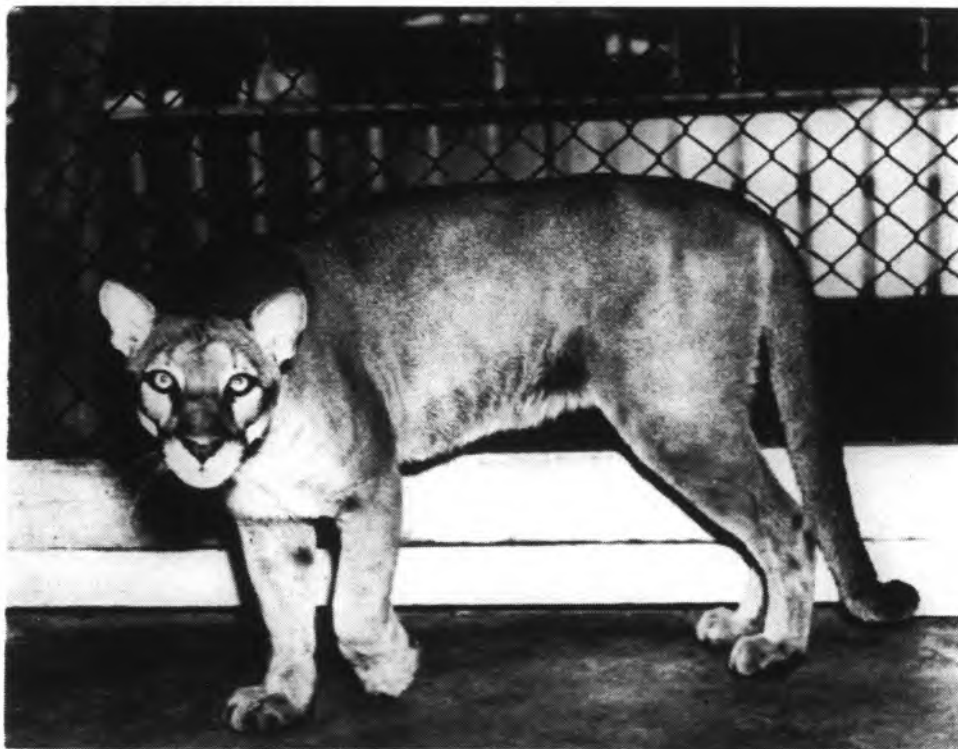


Outstanding progress has been achieved in law enforcement work, with a number of important policy changes being adopted. The Law Enforcement Division now operates under the direct supervision of the Commission's Assistant Director, and each of the five conservation districts is supervised by a Chief Wildlife Officer. Each district is divided into areas, under the jurisdiction of Area Supervisors.

The Law Enforcement Division has also streamlined its force of personnel, and is now employing fewer wildlife officers than formerly, but is now using a more efficient type of manpower acquired through a higher scale of salaries. The Division has also acquired new uniforms for all of its enforcement officers, as well as additional equipment including four airplanes (one seaplane, one amphibian, and two land planes) for use in observation work, as well as additional vehicles such as Jeeps, swamp buggies and air boats.

Outstanding in progress in law-enforcement work was the acquisition of a wildlife officers training school in Williston. Eight classes of 20 wildlife officers have attended the school to date, receiving a rigid 28-day curriculum of practical training.

Panther and black bear, Florida's two big game animals, were placed on the protected game list in 1950.





In public information and education work, the Commission has seen a rapid growth in the importance and duties of its Information and Education Division, resulting increase in general public interest in the problems of wildlife conservation. Information and Education took a long step forward by inaugurating its wild animal and bird zoo at the Florida Boy's Industrial School in Marianna. The Division also made several vital changes in its monthly magazine, **FLORIDA WILDLIFE**, by accepting advertising for the first time and also putting the magazine on a \$1.00 annual subscription basis, in order to help defray the costs of publication.

Information and Education has also had to enlarge and increase all of its services, including public speaking, newspaper releases, fair exhibits, special promotions such as the Fishathons for children, and film library.

#### LICENSE SALES BY COUNTIES—1948-49

	1948-1949 FISHING		1948-49 HUNTING	
	Resident	Non-Resident	Resident	Non-Resident
Alachua.....	6,557	1,251	3,664	16
Baker.....	915	14	686	9
Bay.....	6,407	1,435	1,674	15
Braiford.....	1,240	160	630	6
Brevard.....	1,253	967	1,379	29
Broward.....	4,691	1,110	942	6
Calhoun.....	1,682	6,324	896	37
Charlotte.....	317	146	294	55
Citrus.....	2,733	4,662	1,152	138
Clay.....	1,756	259	857	8
Collier.....	202	54	402	8
Columbia.....	1,523	281	1,248	13
Dade.....	8,107	458	3,974	12
De Soto.....	1,178	117	709	7
Dixie.....	289	261	922	8
Duval.....	20,168	701	6,508	27
Escambia.....	5,983	254	4,652	14
Flagler.....	159	60	376	1
Franklin.....	481	1,028	431	26
Gadsden.....	2,707	3,013	2,412	15
Gilchrist.....	624	52	718	1
Glales.....	767	475	177	3
Gulf.....	1,573	2,925	810	25
Hamilton.....	273	654	606	24
Hardee.....	1,556	84	908	.....
Hendry.....	2,239	946	734	17
Hernando.....	1,252	221	1,161	6
Highlands.....	2,858	1,258	616	9
Hillsborough.....	18,158	625	5,745	22
Holmes.....	1,342	2,694	924	22
Indian River.....	675	177	456	9
Jackson.....	1,516	1,257	2,090	19
Jefferson.....	538	988	740	191
Lafayette.....	570	52	561	5



The Commission has also made vital changes in its Communications Section, originally set up in late 1948 as a part of the Law Enforcement Division, by giving it its own budget and operating framework. In a short time, Communications has grown into a full-fledged unit, operating sixty two-way radios, and ten portable pack-set radios. Besides installing this equipment in Commission vehicles, Communications has also devoted much of its time to an entire modification of all its field radios.

In the line of special projects, the Commission achieved a closed season on alligators for the first time, acting on recommendations of its eight-member board of advisers. Another project was the preliminary work necessary for the proposed establishment of a refuge for the famous miniature Key Deer which are rapidly nearing extinction.

#### LICENSE SALES BY COUNTY—1948-49—Continued

	1948-1949 FISHING		1948-1949 HUNTING	
	Resident	Non-Resident	Resident	Non-Resident
Lake.....	4,296	5,541	2,176	47
Lee.....	1,456	450	973	21
Leon.....	4,797	5,065	4,611	274
Levy.....	834	106	1,993	15
Liberty.....	616	424	633	11
Madison.....	784	297	758	30
Manatee.....	2,101	311	1,017	11
Marion.....	5,008	6,644	4,158	94
Martin.....	664	430	329	22
Monroe.....	18	.....	64	.....
Nassau.....	398	211	1,397	11
Okaloosa.....	1,432	974	2,503	43
Okeechobee.....	1,554	1,150	351	11
Orange.....	13,311	3,923	2,980	33
Osceola.....	1,435	974	870	9
Palm Beach.....	4,894	802	1,938	19
Pasco.....	2,169	348	1,177	8
Pinellas.....	5,703	774	1,662	20
Polk.....	13,043	2,671	5,304	13
Putnam.....	1,904	1,672	1,969	11
St. Johns.....	853	172	2,047	9
St. Lucie.....	1,027	299	635	3
Santa Rosa.....	1,027	235	2,195	10
Sarasota.....	1,586	361	826	8
Seminole.....	3,200	845	1,167	22
Sumter.....	2,498	1,011	1,264	21
Suwannee.....	1,589	120	1,255	19
Taylor.....	841	846	1,603	25
Union.....	343	27	315	.....
Volusia.....	4,649	1,783	3,801	22
Wakulla.....	1,256	2,551	1,004	142
Walton.....	604	1,397	1,510	31
Washington.....	1,968	6,484	955	13
Grand Total.....	190,147	83,861	105,494	1,831

The commission also hopes to continue and expand its scientific research program. Within a period of five years it is hoped that careful study can be made of virtually every fresh water body in the state in an effort to improve sports fishing. More and more study will be devoted to quail, dove and waterfowl. From these studies will come the solution to our wildlife problem.

A vastly more expanded conservation education program will be activated. More work will be done in the schools in an effort to train the sportsmen of tomorrow in the ways of conservation. Text books will be prepared and visual educational facilities will be explored to the fullest. All this will cost money; perhaps a great deal of money. However, every modern sportsman knows that the dollars spent for conservation today are buying a priceless heritage for the generations to come.

#### LICENSE SALES BY COUNTIES—1949-50

	1949-50 FISHING		1949-50 HUNTING	
	Resident	Non-Resident	Resident	Non-Resident
Alachua.....	6,654	1,831	3,389	18
Baker.....	794	15	655	4
Bay.....	6,843	1,351	1,461	24
Bradford.....	1,218	137	586	6
Brevard.....	1,359	887	1,302	42
Broward.....	4,536	1,217	1,007	7
Calhoun.....	2,035	6,503	848	19
Charlotte.....	233	70	303	53
Citrus.....	4,093	5,118	1,146	135
Clay.....	2,532	391	829	9
Collier.....	175	76	468	5
Columbia.....	1,851	323	1,154	15
Dade.....	6,479	364	3,822	11
De Soto.....	1,008	70	613	6
Dixie.....	273	483	681	10
Duval.....	19,735	589	5,890	26
Escambia.....	6,921	275	4,613	9
Flagler.....	145	55	390	3
Franklin.....	472	962	398	36
Gadsden.....	3,005	3,086	2,152	17
Gilchrist.....	743	120	573	7
Glades.....	636	386	151	9
Gulf.....	1,907	3,188	797	24
Hamilton.....	275	660	483	15
Hardee.....	1,537	86	872	3
Henry.....	1,808	785	694	8
Hernando.....	2,733	269	947	9
Highlands.....	2,768	1,253	682	12
Hillsborough.....	7,521	322	5,552	8
Holmes.....	1,558	3,026	931	24
Indian River.....	596	161	417	10
Jackson.....	1,987	1,930	1,990	18
Jefferson.....	489	1,042	571	165
Lafayette.....	442	62	420	3

In summary, the Game and Fresh Water Fish Commission has progressed in many fields during the biennium, and has accomplished the formation and adoption of many new methods of procedure in its conservation work. Much of the progress made during the two-year period has been immediately visible, while other long-range improvements will not be evident for some time.

#### LICENSE SALES BY COUNTIES—1949-50—Continued

	1949-50 FISHING		1949-50 HUNTING	
	Resident	Non-Resident	Resident	Non-Resident
Lake.....	4,382	6,169	2,006	45
Lee.....	1,298	357	1,003	14
Leon.....	4,406	6,127	3,383	292
Levy.....	1,159	274	1,769	8
Liberty.....	716	977	530	11
Madison.....	812	435	614	33
Manatee.....	2,191	241	914	7
Marion.....	4,871	6,804	3,653	79
Martin.....	562	346	299	18
Monroe.....	12		59	
Nassau.....	406	169	1,170	5
Okaloosa.....	1,723	941	2,596	51
Okeechobee.....	1,498	1,001	362	13
Orange.....	12,600	3,893	2,686	21
Osceola.....	1,418	936	743	6
Palm Beach.....	3,889	689	1,895	20
Pasco.....	3,537	371	1,075	7
Pinellas.....	6,697	759	1,519	12
Polk.....	15,157	3,752	4,955	17
Putnam.....	1,837	1,768	1,826	14
St. Johns.....	877	210	1,902	3
St. Lucie.....	880	261	550	4
Santa Rosa.....	1,130	191	1,916	9
Sarasota.....	1,599	291	751	9
Seminole.....	3,178	738	1,058	15
Sumter.....	3,228	1,021	1,081	13
Suwannee.....	1,640	243	1,105	6
Taylor.....	882	1,255	1,414	16
Union.....	336	17	233	
Volusia.....	4,223	1,826	3,496	28
Wakulla.....	1,182	2,655	942	183
Walton.....	747	2,172	1,466	24
Washington.....	1,921	6,283	856	18
Grand Total.....	186,265	90,245	96,645	1,771

# GAME MANAGEMENT DIVISION



O. EARLE FRYE, JR.  
*Chief Wildlife Biologist*

EDWARD B. CHAMBERLAIN, JR.  
*Asst. Chief Wildlife Biologist*

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# GAME MANAGEMENT

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THE past two years were marked by continued progress in wildlife management. Three major factors combined to bring this about: (1) The Constitutional Amendment of 1942, which enabled the Game and Fresh Water Fish Commission to proceed in wildlife restoration with a minimum of political interference. (2) The demand backed by sportsmen for sound wildlife management practices to procure better hunting on the ever decreasing hunting territory for the ever increasing army of hunters. (3) Pittman-Robertson appropriations which have continued to make funds available for a constructive research, development, and land acquisition program.

This period has witnessed further employment of men trained in the science of wildlife management; a greater emphasis on sound wildlife management practices as determined by the research program; a continuation of a well balanced research program designed to diagnose the basic causes of game shortages and to work out methods of remedying such shortages; and a tremendous increase in the amount of land acquired for the development of public hunting areas. Accompanying these activities has been further minimization of such popular but generally unproductive so-called conservation measures as haphazard restocking and predator control.

There is a gradual, almost reluctant, acceptance of a realistic viewpoint toward wildlife management; a realization that wildlife management is not simply restocking with game, employment of additional game wardens, or setting of hunting seasons, but instead is a tremendous complexity of biological, human, and economic relationships.

Florida has definitely passed through the "save what we have left", politically run phase of wildlife management and is headed toward a progressive program which will result in an increased harvestable surplus of game for the Florida sportsman.

The most important game birds and mammals of Florida are the bobwhite quail, the white-tailed deer, the wild turkey, the several breeds of wild ducks and geese, the mourning dove and the grey squirrel. These animals will be taken up individually later in this report with brief remarks as to the steps that have been taken toward their management. Following the discussion of individual species will be a brief report of Pittman-Robertson activities.

### **Acquisition of Land for Public Hunting**

Particularly outstanding among game management activities during the past two years have been those activities designed to furnish hunting to the general public either through the purchase of land or the acquisition of hunting rights on private land.

The lands at present either belonging to the Commission or under a game management agreement between the Commission and private or Federal owners are approximately 918,000 acres open to controlled public hunting, 841,000 acres open to uncontrolled public hunting, and 899,000 acres in breeding grounds.

Most pressing is the need for adequate protection and establishment of controlled hunts on the 841,000 acres now open to uncontrolled public hunting and at present not supporting a fraction of the game of which they are capable. In addition, certain portions

Adequate game management funds are needed to furnish hunting acreage for the 'little' hunter.





of the 899,000 acres of Commission managed lands now in breeding grounds can be opened to public hunting when adequate game management funds are available to produce a surplus of game on such areas and protect it against overshooting.

Besides the above lands now available for management, the Commission has unlimited opportunities of acquiring, through co-operative agreements, public hunting rights on private lands. Under the terms of such agreements, the Commission, by furnishing wildlife officers and such services as fencing or fence maintenance, offers the landowner assistance in protecting and managing his property, plus the public good will that accompanies the knowledge that he is contributing his land for public hunting. The Commission, during the past two years, has entered agreements with private landowners which permit the operation of controlled public hunts on three areas totalling approximately 350,000 acres. Such agreements are usually made by assigning wildlife officers (salary and expenses approximately \$4,000.00 per man per year) to the property at a rate of one man per 20 to 50 thousand acres and furnishing fencing and fence maintenance proportionate to the amount and quality of the acreage involved.

Outright monetary lease of hunting rights is inadvisable because the Commission cannot hope to compete with wealthy individuals on a purely financial basis. Also such a lease payment on one tract of land would more or less morally obligate the Commission to the impossible financial burden of paying similar lease fees on the vast areas of private lands now open but rapidly being closed to public hunting.

Land purchases for public hunting under existing high costs of land are usually impractical except in a few cases where sub-marginal lands of value principally for wildlife can be acquired at low cost.

Lands now available to the commission for public hunting use through agreement or ownership occur in Santa Rosa, Walton, Okaloosa, Bay, Gulf, Calhoun, Liberty, Wakulla, Leon, Baker, Columbia, Taylor, Dixie, Lafayette, Lake, Levy, Citrus, Hernando, Pasco, Sumter, Charlotte, Palm Beach, Marion, Highlands, Polk, Manatee, and Sarasota Counties.

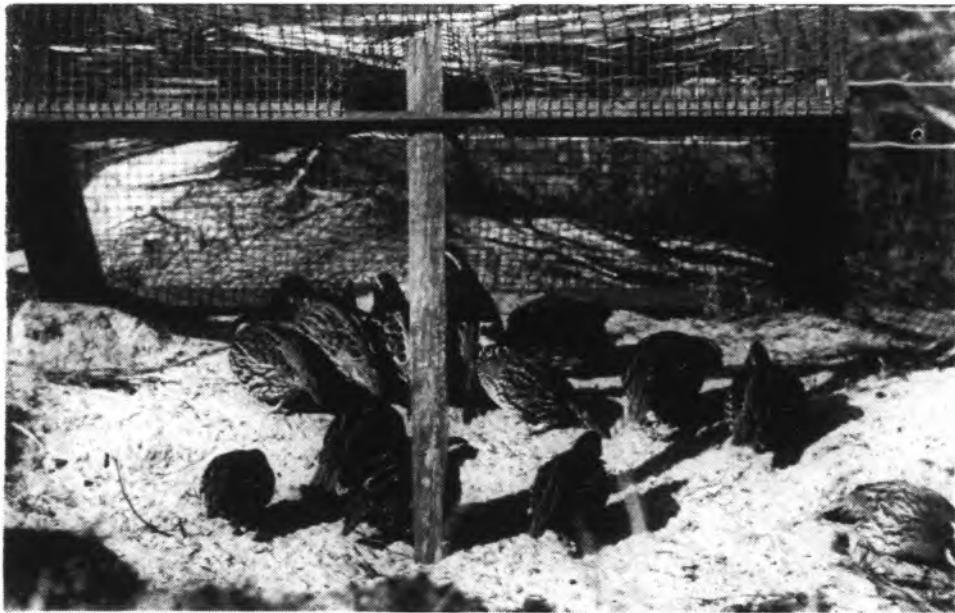
## SUMMARY OF GAME MANAGEMENT ACTIVITIES BY SPECIES

### Quail

There are three primary clear cut factors that have been operating to reduce quail in Florida in recent years. These are: (1) Increased mechanized "clean" farming. The first farming operations in Florida with their small fields, rail fences, and general crops resulted in the production of ideal quail habitat. With the advent of mechanized equipment fields were enlarged, fence rows cleaned out, and large acreages planted to one cash crop such as cotton, and quail decreased. (2) The growing of dense stands of unburned slash pine for pulpwood in north and west Florida. The paper mills in Florida have caused a demand for enormous quantities of young pine for pulpwood. This has resulted in the growth, largely through fire protection, of dense stands of slash pine and a heavy understory of wiregrass and other vegetation that combine to produce very poor quail habitat. (3) The disking of tremendous acreages of formerly good quail territory in south Florida for improved pasture. Here the removal of palmetto cover has resulted in complete elimination of quail from such areas. Quail must have cover to survive.

Unfortunately for quail, these practices are all of great importance to the economy of the state and cannot therefore be sacri-

Wildlife officers trapped and relocated to public hunting areas 16,000 of Florida's number one game bird.





ficed for the welfare of quail. On the other hand, there are minor modifications of all three practices that can result in substantial benefits to quail if sufficient inducement can be found to influence the landowner to apply the remedial measures.

The importance of overhunting of quail has been greatly over-emphasized. Because of the distribution of areas such as dense woodlands, swamps, or citrus groves where the birds are comparatively safe from the hunter, and the fact that quail hunting becomes no longer worthwhile long before all breeding stock is eliminated from a large area, quail have rarely been reduced to such an extent that they cannot build up to the carrying capacity of the land within two normal years. The problem of quail management in the state is clearly, then, one of increasing the carrying capacity of the land through habitat improvement.

On the other hand, it may be that in certain areas, such as the open flatwoods of south Florida where birds are particularly vulnerable to overshooting, quail are reduced every year below the normal breeding population of the area. Under such conditions careful restocking with wild quail is believed to be worthwhile.

Following this thought a state wide quail trapping program was organized and put into effect in the spring of 1949. Under this program 7,500 birds were trapped in 1949 and 8,500 in 1950. These birds were trapped by wildlife officers and interested private individuals and as a general rule were released on territory open to public hunting. In a few cases private individuals trapped birds from their own land to be released at other places on their own land. Such trapping was done at the expense of the individual and under the direct supervision of a wildlife officer.

Birds released on public hunting lands were trapped from breeding grounds, urban areas and similar tracts where they cannot be shot and were presumably "going to waste." The trapping program is being directed by a trained biologist. All birds are banded and careful records are kept of the success of the project to determine if the results justify the expenditure of funds in trapping and moving quail.

In addition to the quail restocking efforts three Pittman-Robertson projects dealing specifically with quail were carried out or were started during the past two years. These projects are discussed in the portion of this report dealing with Pittman-Robertson activities.

## Deer

The situation with regard to deer is entirely different from that outlined for quail. Whereas the primary factor that can increase quail in Florida is habitat improvement, the primary deer management need is protection against overhunting. There is a tremendous amount of satisfactory deer habitat in Florida that is now underpopulated. On such areas deer can be increased tremendously, simply by protection against overhunting and judicious restocking.

One important illegal hunting practice that has helped decimate the Florida deer population has been that of "jacklighting" deer at night. In using this method the hunter blinds the deer with a bright light and is able to approach within easy gunshot range. A ruling by the Game and Fresh Water Fish Commission making illegal the possession of a light and a gun at night for the obvious purpose of molesting game has gone a long way toward stamping out this completely unsportsmanlike practice.

The deer population in Florida has shown a definite increase in the past few years due to three major factors: (1) Better enforcement of game laws; (2) The posting of large tracts of land by cattlemen and other private interests. (3) The general movement of homesteaders from rural areas, particularly in the ranching areas of south Florida.

The Florida deer population suffered a tremendous blow during the deer slaughtering tick eradication campaign of 1939 to 1944. During this period an official total of 9,478 deer were slaughtered in Orange, Osceola, Glades, Highlands, Hendry and Collier Counties. Since 1942 Florida has made extensive efforts to replace these deer.

During the past two years 639 Wisconsin deer and 144 Texas deer were purchased and released in the state for restocking purposes. All of the Texas deer and 482 of the Wisconsin deer were purchased with game commission funds. The remaining 157 deer were purchased by the Livestock Sanitary Board in line with its obligation to replace the deer slaughtered during the tick eradication campaign. Since 1948 all deer released in the state have been ear tagged with metal tags as an aid to tracing the survival in Florida of imported deer.

No attempt is made to divide deer equally among different counties. The Commission favors the much more effective policy

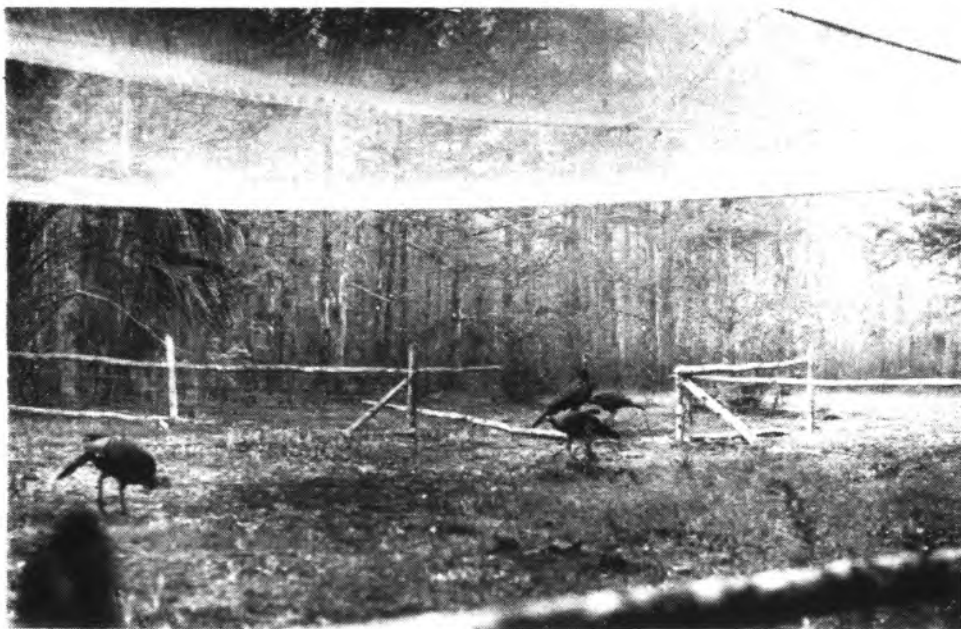
of placing deer in counties with good deer habitat and low population rather than one of arbitrarily dividing the animals available. Particular emphasis in the deer restocking program is placed on large blocks of good deer habitat such as the Hardee, Manatee, Sarasota county area that had been closed to the taking of deer. During the past two years, five Pittman-Robertson projects devoted either to deer or to deer and turkey have been active in Florida.

## **Turkey**

As with deer, the immediate problems of turkey management in Florida are protection from man and the restocking of key areas. The Florida deer and turkey survey that was completed in 1948 indicates that Florida has more turkey and probably more good turkey habitat than any state except Texas. At the same time it has shown that much of the turkey habitat is underpopulated.

Florida has underway a long range turkey restoration program under the direction of a trained wildlife specialist. The basis of this program is the establishment of key turkey restoration and management areas over the state. Most of the areas discussed under the land acquisition section have been acquired as a part

During the past two years 224 wild turkeys have been trapped and released in understocked areas of the state.



of the deer and turkey restoration program. Where necessary such areas will be restocked with wild trapped native Florida turkeys. Arrangements have been made to trap turkeys on land in Glades County belonging to the Lykes Brothers Corporation and on land in Polk county belonging to William Candler. During the past two years a total of 224 turkeys have been trapped for release in understocked areas in the state. As with deer restocking, emphasis is being placed on releasing turkey in areas of suitable habitat with a low turkey population rather than in attempting to distribute turkeys equally over the state.

During the period covered by this report the Commission purchased 525 half wild turkeys which were liberated in several counties of the Fifth District. The Commission is aware of the fact that the half wild turkey is a poor substitute for the native wild trapped bird for restocking purposes, but felt that in the absence of a

The commission purchased, out of state, 783 white tail deer for restocking many underpopulated areas.



readily available stock of wild birds this action might be justified. In other states extensive studies on the survival of half wild turkey have been conducted, and it has been found that only under the most careful protection from overhunting have these birds been able to survive. Many of the claims of success made by advocates of the use of domestic turkeys in Florida seem to be without foundation. It appears that most of the increase in turkeys on areas restocked with tame birds can be attributed to the remaining wild stock that was given an opportunity to increase as a result of the protection from overhunting that accompanied the restocking efforts. There is no doubt that semi-domestic turkeys can be raised under semi-domestic conditions but the end result is a half wild barnyard fowl that has lost much of its beauty and sporting value and is unable to cope with heavy hunting pressure.

Four of the five Pittman-Robertson projects mentioned in the discussion of deer deal also with turkey. As a general rule factors influencing one species are important to the other.

## **Waterfowl**

Though duck and goose hunting in Florida may not be quite so important as it is in some of the states to the north, it is still popular enough to attract some 20,000 to 22,000 hunters per year. This represents an increase of 100% since 1943-44. During the 1949-50 season, Florida had more waterfowl than any other Atlantic Flyway state, and in the Southeast ranked behind Louisiana and Arkansas only in number of hunters and second only to Louisiana in total kill. All this despite the fact that only a comparatively small percentage of the tremendous amount of water and marsh area in Florida is good waterfowl habitat. The Lake Okeechobee marshes, Kissimmee River and upper St. Johns river marshes, Merritt's Island, Indian and Banana Rivers, the west coast marshes from the Aucilla River south to the Chassahowitzka River, and a few interior lakes in north Florida are the state's outstanding waterfowl areas.

Waterfowl hunting in Florida is dependent largely upon the status of the continental waterfowl population, and as it now stands, there is little that Florida can do to increase waterfowl other than supply good wintering areas. This, however, is most important and deserving of considerable time, attention, and money. There is a definite need for developed, managed waterfowl areas, both as refuges and public shooting grounds.



Also, Florida is unique among the states in that it possesses an excellent game duck, the Florida duck or Florida mallard, that breeds and remains in the state throughout the year. If a suitable method for increasing the number of this species can be found, it offers good possibilities for supplying duck hunting to the Florida sportsmen.

One Pittman-Robertson project was begun in 1948 to inventory and classify waterfowl habitats and population within the state. The habitat investigations have now been largely completed, and have yielded valuable information on the type, location, and quality of Florida's waterfowl habitat. From this, specific and definite means for improving this habitat, enlarging its carrying capacity, and increasing the state population, have been worked out. Population inventories and collection of kill data are annual, continuing jobs. From these data are derived information used in the important work of setting the yearly hunting regulations. Study of the ecology and management of the Florida duck is, similarly, a continuing job which offers the possibility of good returns.

### **Mourning Dove**

As with waterfowl the Mourning Dove is classified as a migratory bird and comes under the jurisdiction of federal game agencies. It is most important as a game bird in the corn and peanut farming areas of the state. Because of the decrease in dove populations in recent years and because of the annual controversy concerning dove seasons and the general lack of knowledge of dove movements and life history, a coordinated study of the mourning dove is under way in the southeastern states. Florida has participated in this study since the summer of 1949. During this period a total of 2,897 doves have been banded in the State. In addition a great deal of information has been gathered relative to dove life history, local movements within the state, and factors effecting dove abundance. Particularly outstanding among the the results of this study has been a clarification of the mystery of the source and destination of the migrating birds that appear in great numbers on the upper west coast and in the Dade, Broward and Monroe County area in September and October.

Information resulting from the cooperative study in the southeastern states should go a long way toward settling the always controversial questions dealing with the setting of dove seasons and regulations of dove hunting. The dove study has been conducted as a part of the Pittman-Robertson program.

## **Squirrel**

Of the two species of squirrel listed as game animals in Florida the cat or grey squirrel far outclasses the fox squirrel in numbers, popularity, and quality as a game animal. Fox squirrels are generally shot incidentally by persons hunting other game.

One squirrel research project was begun in September 1949 and completed in September 1950. This study was conducted under a cooperative agreement with the University of Florida and has resulted in the accumulation of a great amount of information about the hitherto little known Florida Grey Squirrel. Details of this study are presented in the discussion of the Gulf Hammock Wildlife Investigation.

## **Pheasant**

For the past two years the Commission has contributed \$500.00 per year to a pheasant propagation project sponsored by the Hardee County Sportsman's Association.

The Commission recognizes the very slim possibility of pheasants becoming established as a game bird in Florida but felt that the project was worth while as an experiment under the particular conditions presented by Hardee County. The program has been well and conscientiously conducted and should determine conclusively whether or not pheasants are adaptable to Florida conditions. Quite possibly the greatest value of the pheasant propagation program has been its influence in bringing about a conservation mindedness in Hardee County responsible to a great degree for the success of the deer and turkey restoration program in effect in that county.

## **THE PITTMAN-ROBERTSON PROGRAM**

For the past two years much of the financial load of Florida's wildlife management program has been carried by the United States government under the provisions of the Federal Aid in Wildlife Restoration Act—commonly called the Pittman-Robertson Act. This Act, approved by Congress in 1937, provided that funds realized from an excise tax on sporting arms and ammunition be apportioned to the states for use in wildlife restoration work, according to their area and their annual sale of hunting licenses. The state must match each three dollars of federal money received with one dollar of state money.

This money is to be spent by the state either on research, development, land acquisition or maintenance of projects, with a small percentage of the total fund set aside for administration. All expenditures must be approved by the U. S. Fish and Wildlife Service, the trustees of the Pittman-Robertson fund.

Inasmuch as personnel as well as projects must be approved by the Fish and Wildlife Service, the bill was designed particularly to act as a stimulus to state game departments for beginning a progressive wildlife research and management program under the direction of scientifically trained men.

The Florida program continues to emphasize land acquisition, and to delay development activities until a firm foundation, based on research and sound information, has been laid. In accordance with this general policy are the relative expenditures for research and development for the years of 1949-50 and 1950-51, as presented in Table 1. During 1949-50, 24.7% of the obligated Pittman-Robertson expenditure was for research and 34.2% was for development; during 1950-51, 16.8% is obligated to be spent for research and 40.7% for development. The percentage of money spent for land acquisition will vary from year to year, dependent upon specific opportunities for land acquisition that may arise from time to time. Funds for land acquisition can be taken from the Florida reserve of Pittman-Robertson money.

During the past two years seven trained men and two untrained men were employed for Pittman-Robertson projects. Three of the trained men have Masters' degrees and four have Bachelors' degrees in wildlife management or biology. Two graduate students of the University of Florida were given research fellowships and employed on a temporary basis to do research work needed by the Commission. Both men plan to use their research to satisfy thesis requirements for the Master of Science degree. Consistent with the general policy in effect, no new personnel are employed until there is a definite and easily demonstrated need for them.

Florida's Pittman-Robertson allotment has decreased from the high of \$148,949.46 in 1948 to \$140,905.64 in 1949 to \$121,214.92 in 1950. This is due to a decrease in receipts from the Federal excise tax on sporting arms and ammunition. Following is a discussion of those projects active during the two-year period covered by this report.



## **Charlotte County Game Management Area**

In 1941, purchase of a 62,000 acre tract of land in Charlotte County was begun. Acquisition activities on this project have been continued during the past two years. These activities include purchase of outside holdings, clearing of titles of lands purchased prior to the present biennium and obtaining Federal reimbursement for state funds spent in the acquisition of Charlotte County lands. The Game and Fresh Water Fish Commission now owns most of the land enclosed within the original purchase boundary.

## **Charlotte County Quail Investigations**

The Charlotte County Quail Investigation was designed specifically to develop methods of increasing quail on the Charlotte County Area and generally to develop methods compatible with cattle raising for increasing quail in south Florida's flatwoods.

This study has been continued during the present biennium on a greatly reduced scale. At present emphasis is being placed on obtaining data about year to year quail population fluctuations, as correlated with food and weather conditions. Also, extensive experiments with the artificial feeder system are being carried out.

Charlotte County research has been directed along several major lines of investigation: food habits of quail; weather, shooting pressure, and other factors influencing the quail population; the sex and age composition of quail population; the effect of burning, grazing and disking on vegetation and the quail population; experimental quail food planting; and use of automatic quail feeders.

To date no plant has been found, with the possible exception of one or two native species, whose planting as quail food appears to be a practicable quail management procedure in south Florida flatwoods. The best method of increasing quail food in Charlotte County, other than outright feeding, appears to be the stimulation of native quail foods by the proper use of fire, grazing and disking. Judicious burning is definitely beneficial to quail and indications are that winter grazing will also improve quail habitat in flatwoods areas.

Disking has been shown to greatly increase quail food plants on ungrazed areas the first year following disking. On areas not protected from grazing cattle seek out disked places and destroy most of the quail food plants. The planned management of quail on the Charlotte County area revolves primarily around winter grazing, controlled burning, removal of cattle during the quail food growing season and artificial feeding.

Since the spring and summer of 1948 experiments with artificial feeding of wild quail have been conducted. In the spring of 1950 these experiments were enlarged to include three areas of approximately 5,000 acres each in Charlotte, Highlands and Pasco Counties. Records are being kept of the success of the feeding methods in increasing quail. Results of the studies to date indicate that quail can definitely be increased by the use of artificial feeders but the technique has yet to be perfected to such a degree that quail can be produced by this method at a cost that the average hunter can afford to pay.

Since the beginning of the Charlotte County study, analysis has been made of the crop contents of more than 2,500 quail. Most of these birds were obtained from hunting lodges in Charlotte County. In addition, more than 9,000 quail have been examined for sex and age. Information resulting from the latter study is extremely useful in evaluating breeding success as correlated with weather, hunting pressure, and other factors. The results of the first four years of the Charlotte County Quail Investigation will be published in 1951.

### **Charlotte County Quail Project**

This project is designed to put in effect management practices developed through the Charlotte County Quail Investigation. Primary activities of the project have been control burning, disking, quail food planting, and maintenance of roads, bridges, and other installations on the Charlotte County Wildlife Management Area. During the biennium covered by this report, approximately 15 acres were disked and sown to a sod forming grass or quail food and approximately 10 miles of 24-foot fire lanes were similarly prepared. A new grazing lease was signed with the Babcock Florida Company whereby cattle are to be grazed on three of the four approximately 15,000-acre pastures during only the months of October through May. An annual rental of 8 cents per acre is paid on such land. Year round grazing is being permitted on one pasture as a check on the effectiveness of eliminating summer grazing. During the past two years the Babcock Company has constructed fences on the area that will be useful to quail management as well as cattle operations. This company has also contributed seed and fertilizer for grass planting on some of the disked strips. Further plans are being worked out with this company whereby the company and the Commission will share the expense

of land improvement activities that will benefit both quail and cattle.

A controlled public quail hunt was conducted on the Charlotte County area during the 1950-51 hunting season. Permits for the hunt cost \$5.00 per day. After a slow start, due apparently to lack of information about the hunt in spite of good newspaper and radio coverage, the hunt proved highly successful. The 312 hunters purchasing permits bagged 2,278 birds which, with 178 known crippled, amounted approximately to the 2,500 birds slated to be harvested. All hunters reported satisfaction with the hunt.

The Charlotte County hunt was conducted for two principal reasons: To permit the hunter to harvest the unusually good crop of quail produced in 1950 and to determine if the average Florida hunter is willing to pay a reasonable cost for quail hunting. The heavy expense necessary for intensive quail management on Commission lands is justifiable only if the comparatively few hunters benefiting from such activities bear a large portion of their cost.

#### **Coordination Project**

The Coordination Project is designed to serve as a medium for liaison between the U. S. Fish and Wildlife Service and the Game and Fresh Water Fish Commission and to furnish immediate supervision of Pittman-Robertson projects. One particular responsibility of the coordinator is the preparation of plans and reports for all projects.

#### **Florida Deer and Turkey Survey**

Florida with its 22,000,000 acres of forest lands, large uninhabited areas, and mild climate, offers unusual opportunities for production of deer and turkey. It is doubtful that any other southern state has the amount of deer and turkey habitat that is found in Florida. This is due, to a large extent, to the generally good distribution of different types of cover over the state. Almost every area of pine flatwoods is broken up by cypress ponds, cabbage and oak hammocks, or heavily forested stream bottoms. Almost every area of rolling sand hills is broken by lakes surrounded with cypress, bayheads, or oak hammocks. Many of the prairie lands of south central Florida have occasional cabbage palm or oak hammocks. In the cypress swamps of the Everglades there are ridges of slight elevation where grow pines, palmetto, oaks, and tropical broad-leaved trees. Even some of the sawgrass marshlands of extreme south Florida are dotted with frequent islands of bay, myrtle, holly and fern that offer some haven for deer.

The state-wide deer and turkey survey, completed in 1948, revealed an estimated deer population of 32,466 in 63 counties. Only four counties did not have deer. There are 10 counties with a population of 1,000 or more; 13 counties with from 500 to 999; 7 counties with from 250 to 499; 16 counties have from 100 to 249; and 17 counties have from 1 to 99. There are no forest areas of 100,000 acres or more that do not have a remnant of a deer herd. The counties without deer are devoted to agriculture and are divided into small rural ownerships.

The turkey population in the spring of 1948 was estimated to be 26,854. There were 7 counties with a population of 1,000 or more; 9 counties with 500 to 999; 16 counties with 250 to 499; 12 counties with 100 to 249; 18 counties with 1 to 99; and 5 without a population.

The deer and turkey range has been divided into two classifications—"good" and "habitable". "Good" habitat is that type of range that will support a desirable population for the entire year. "Habitable" habitat is that type of range that maintains only a

Gators, too, will be able to stage a comeback. Closed season now protects them.





very small population throughout all season. In this classification will fall areas that support a desirable amount of game for only short periods of time and then, due to a decrease in food or cover, or both, this population is forced to move elsewhere.

Florida has 14,209,000 acres of good deer range and 9,436,200 acres designated as habitable; 14,309,000 acres of good turkey habitat and 8,727,400 acres designated as habitable. Very little of the total forest game habitat in the state is desirable for only one of the two species.

The results of the Florida deer and turkey survey were published in 1950 in Technical Bulletin No. 1. This survey is being used as a basis for the statewide deer and turkey restoration program.

### **Farm Game Habitat Restoration**

This project was begun in June 1947. Its specific objective is the improvement of agricultural land for quail, primarily through the planting of field borders to quail foods and the encouragement of the use of such plants as Florida beggarweed for cover crops and soil builders. During the 1949-50 biennium the following wildlife planting materials were provided free of cost to landowners in north Florida who were interested in farm game habitat improvements: bicolor lespedeza—748,000 seedlings, thunbergii lespedeza—234,000 seedlings, common lespedeza—1,878 pounds of seed, Florida beggarweed—700 pounds of seed, partridge pea—123 pounds of seed, multiflora rose—31,000 seedlings. Most of this material was distributed through a cooperative arrangement with the United States Soil Conservation Service. Success from plantings of these species was in proportion to the care and attention they received from the landowner.

The bush lespedezas, bicolor and thunbergii, are well adapted for food plantings on the better soils of north Florida provided they are planted, fertilized and maintained properly. Thunbergii appears to be much more adaptable and plans are to abandon the use of bicolor in favor of thunbergii as soon as sufficient supplies of thunbergii are available.

In the spring of 1949, a 5,500-acre quail management area was established in Jackson County for the purpose of determining the value of bicolor in increasing quail on a large tract of average farm land. One-hundred-seven bicolor plantings were made on this area in 1949. Many failed due to drought and had to be planted again in 1950. The 1950 plantings were generally successful.

The use of multiflora rose for fencing and game cover purposes is relatively new to Florida—the first planting having been made in the spring of 1949. Although its adaptability to Florida conditions is still uncertain, it appears to be suitable for fencing purposes on the better soils of north Florida if planted properly and fertilized heavily. After from four to six years this plant forms a dense tangle of thorny vegetation forming excellent wildlife cover and serving as an impenetrable stock fence that needs no repair or upkeep. It is very successful in northern states and is much in demand by farmers.

Through the cooperation of the Florida Agricultural Experiment Station and the Florida Forest Service the Commission is now able to produce much of its planting stock in Florida at a much lower rate than that for which such materials are obtainable from other states or private sources.

### **Palm Beach County Land Acquisition**

In 1947 the Game and Fresh Water Fish Commission acquired an option to purchase approximately 50,000 acres of land in Palm Beach County at \$5.00 per acre. The purchase of this land was to be extended over a period of five years. During the biennium covered by this report 20,479 acres of this area were acquired with Pittman-Robertson funds. The total area to which the Commission now holds title is 45,353 acres, leaving 7,780 acres to be purchased next year.

### **Gulf Hammock Deer and Turkey Survey**

This project was begun in February, 1948, and was completed in February, 1949. The results of the survey are being prepared for publication. Information from this study forms the basis for the present Gulf Hammock wildlife management program.

### **Palm Beach County Fencing**

Between June, 1948 and March, 1949, a four-strand barbed wire fence was constructed around the Palm Beach County Wildlife Management Area, the total cost for constructing the 32.8 miles of fence was \$11,492.09. The cost includes constructing, painting, and hanging nine board gates. Bids for the construction of the fence were solicited and the contract was awarded to Mr. D. W. Rowell of Indiantown. Mr. Rowell's work was highly satisfactory and resulted in the construction of an excellent fence.

## Florida Waterfowl Survey

This project is designed as an investigation of waterfowl habitats and populations throughout the state. Information resulting from it will serve as a background for a constructive waterfowl management program. Among its particular aims are the development of techniques for waterfowl habitat improvement and investigation of possible methods for increasing the population of the Florida duck.

The bulk of the work has been concerned with waterfowl habitat investigations, with particular emphasis on food plant distribution and abundance. In these investigations, which have been conducted on over 200 different areas, water quality tests are made, the type of substratum, physical characters of the shore, and amount of water level fluctuation are noted. Submerged and emergent vegetation is recorded as to species, relative abundance and, where possible, limiting factors. The knowledge of plant succession, growth requirements, and limiting factors to be derived from the accumulation of such data is necessary to any sound waterfowl management program. This is especially true in the south, where waterfowl management is very largely habitat management, i.e. water and plant manipulation. As a result of this work, more is now known of Florida's waterfowl habitats than ever before. Sound management techniques have been developed, and the water quality tolerances and preferences of 63 common aquatic plants have been determined. This latter represents pioneer work of its type in the southeast.

Throughout the work so far, it has been apparent that over the state as a whole good food plants are not abundant. This seems to be the most widespread factor limiting the value of the various waterfowl areas. On the other hand, there are several large areas in the state which are quite good. In them the number of wintering waterfowl will be dependent on the continental population as well as on local conditions. Unfortunately, the general trend has been toward diminishing waterfowl habitat. Certain developments for agriculture, pasture, navigation, and flood control programs have been, or promise to be, extremely detrimental to waterfowl. For example, if certain proposed navigation projects in the vicinity of Merritt's Island are carried out, that area, which now carries at times better than a quarter million birds, will be so reduced in value within eight to ten years as to be of negligible importance to waterfowl. Similarly, plans for the development of the St. Johns

and Kissimmee valleys could result in a marked decrease in waterfowl values. On the other hand, plans for the construction of impoundment areas in the Everglades should noticeably improve the waterfowl habitat there.

Because of the general decrease in waterfowl habitat, it becomes more and more important that the Commission should control, develop and manage some good waterfowl areas. Special attention has been devoted to locating suitable areas, and management plans for several have been drawn up. Techniques for development and maintenance of good habitat conditions on refuges and public shooting areas have been worked out.

In addition to the work on habitats, considerable time has been spent on population and kill data investigations. Monthly inventories, flown over important sample areas, yielded valuable information on population fluctuations, trends and movements. Collection of kill data gave information on species composition, average daily bag, total kill, and crippling loss. All this information is vitally important in formulating hunting regulations. It shows too, that waterfowl hunting in Florida compares very favorably with that of any state in the southeast. For the 1949-50 season, the average daily bag of ducks was 2.65 birds, or 3.06 if cripples are included. The average daily bag of coots was 2.14 birds, and of geese 0.07 birds. The average season bag was 16.7 ducks and 13.5 coots, with the average hunter being afield 6.3 times. Ring-necked duck made up 27.8% of the kill, pintails 15.7% and scaup 11.7%. The remaining 44.8% was composed of 14 species, with teal, widgeon, mallard and Florida duck being the more important. Few states can show more successful hunting than this.

The monthly inventories have shown that waterfowl populations wintering in Florida have held up quite well in contrast to the downward continental trend of the last two years. They have also demonstrated that the hunting season generally coincides with the period of greatest waterfowl abundance.

The status of the state's two resident species, the wood duck and the Florida duck, has been quite good during the past two years. Airplane inventories have revealed that the Florida duck, though smaller in total number than was hoped, has had a gratifying increase each year since 1948. From a total of 18,000 to 20,000 birds at that time, the population has risen to between 25,000 and 27,000 birds in the early fall of 1950. Maintenance of proper and sufficient habitat is essential if this bird is to remain



an important game species. Within its range this bird is heavily hunted and yields a harvest out of proportion to its total number.

Future activities of this project will consist of a continuance of the population, kill data, and Florida duck studies. In addition, more attention than heretofore will be devoted to the location, development, and management of waterfowl areas both as refuges and public shooting grounds.

### **Gulf Hammock Fencing Project**

Between August, 1948, and December, 1949, sixty and one-half miles of four-strand barbed wire fence was constructed around the boundaries of the Gulf Hammock Wildlife Management Area. The total cost, including materials, of this fence was \$31,987.21, or \$528.71 per mile.

Before beginning construction of the fence, bids were solicited and resulted in bids of \$1,1552.00, \$960.00, \$591.00, \$300.00, and \$268.80 per mile, not including the cost of materials (\$243.35 per mile). None of the bids was acceptable and a decision was made to construct the fence by force account. The man employed to supervise the work proved completely unsatisfactory, so bids again were solicited and resulted in bids of \$550.00 and \$460.00 per mile, and the proposition made by the Panama City Construction Company to build an experimental five miles of fence for the cost of construction plus 10%. It was felt that the resulting figure would be of value to the Commission in considering possible bids and in determining the actual cost of fencing in Gulf Hammock.

The cost of constructing this five miles of fence averaged \$509.14 per mile. With this figure in mind and in consideration of indications of inefficient utilization of labor, believed due to the fact that the construction company was not financially bound to do good work, a new agreement was worked out with the Panama City Construction Company to construct an additional 11 miles of fence with a guarantee that the construction of the fence would not cost more than \$400.00 per mile. Under the terms of this agreement the construction company was paid \$100.00 per mile to supervise the construction of the fence. This supervision included the employment and management of labor, and the establishment by survey of the property line on which the fence was to be constructed. Upon completion of this 11 miles, another agreement covering the remainder of the fence originally planned was signed by the Panama City Construction Company, reducing the supervision cost from \$100.00 to \$90.00 per mile.

All negotiation finally resulted in the construction of the 53½ miles of fence built by the Panama City Construction Company at a total cost of construction of \$16,473.50, or \$307.91 per mile. This represents a saving of \$152.09 per mile under the lowest possibly acceptable bid of \$460.00, and resulted in the construction of a good fence.

Following the completion of this fence, an agreement was worked out with several small landowners whereby an additional 3,000 acres was included in the fenced management area. The 7 miles of fence bounding this property was constructed by the landowners with material furnished by the Commission.

The fencing picture in Gulf Hammock was complicated by the fact that, apparently, no one was able to judge satisfactorily the cost of fencing under the unusual conditions peculiar to the area. This conclusion is supported by the tremendous variation in bids submitted by contractors presumably familiar with fence construction. The principal obstacles to fencing in the Hammock are the almost impenetrable mud swamps and the rocky nature of the terrain. Limestone is so near the surface in much of the Hammock that post holes must be dug with pneumatic drills, dynamite, or other special tools.

## **Florida Deer and Turkey Restoration**

Under this project is the greater part of the state's deer and turkey restoration program, including acquisition of land for deer and turkey management and trapping and restocking of these species. Most of the lands acquired during the past two years for public hunting have been acquired as a part of the activities of the project.

Particularly outstanding has been the excellent success experienced with turkey restocking in Hardee County—the only restocking area for which detailed accurate information is as yet available. Thirty turkey hens and nine gobblers trapped from the Fisheating Creek Wildlife Management Area were released in Hardee County in the fall of 1949. By the fall of 1950 the original stock had increased to more than 130 birds.

Outstanding among the land acquisition activities of this project during the past biennium has been the acquisition of public hunting rights on approximately 160,000 acres in Lafayette, Dixie and Taylor Counties belonging to P. C. Crapps & Sons and Consolidated

Naval Stores. This area was open to controlled public hunting in the fall of 1950.

Other important land activities include the acquisition of game management rights on the approximately 107,000-acre Avon Park Bombing Range; acquisition of hunting rights on 8,000 acres in Highlands County, acquisition of hunting rights on a 75,000-acre area in Gulf, Bay and Calhoun Counties belonging to the St. Joe and International Paper Companies under agreements for cooperative wildlife management; and cooperative wildlife agreements involving deer and turkey restocking with owners of approximately 300,000 acres in Hardee, Manatee and Sarasota Counties. The project leader and other Pittman-Robertson personnel worked closely with Commissioners and local Wildlife officers throughout negotiations leading to successful completion of land agreements. Much of the success of the land acquisition program has been due to the excellent cooperation and able assistance of wildlife officers.

## **Mourning Dove Study**

This project is designed to gather information about the mourning dove that will lead to a better dove management program and a more equitable division of dove hunting seasons. One qualified biologist is employed for the dove investigations. His duties include employment of trappers for the approximately 20 banding stations maintained over the state, trapping and banding doves at concentration points of importance, developing, putting into effect and supervising a dove census conducted by wildlife officers, rural mail carriers, and game management personnel, and general coordination of all dove investigational activities.

As a rule the banding stations are operated by school boys recommended by the wildlife officers in the counties in which the stations are located. The boys are generally paid \$20.00 per month to trap and band doves coming to the station. Wildlife officers accidentally trapping doves in the quail trapping program also assist in the dove banding program.

When the Southeastern Dove Study is completed the findings will be submitted to the United States Fish and Wildlife Service as a guide for regulating dove hunting and for supplying more of this important game bird for the hunter.

## **Palm Beach County Game Investigation**

The Palm Beach County Game Investigation was begun in the summer of 1949. It is designed to furnish information that will lead to higher production of game on the 53,000-acre Palm Beach County Wildlife Management Area. Among the specific objectives of this project are the preparation of a cover map of the entire area, studies of the effect of burning, grazing and weather on game populations, evaluation of the area as deer, turkey and quail habitat and, most important, the development of methods of improving the area for these three game species. The leader of this project is also assistant leader of the deer and turkey restoration project and spends approximately half of his time on turkey trapping and restoration activities in south Florida.

## **Farm Quail Food Investigation**

This study was conducted between October 1949 and December 1950 at the University Conservation Reserve at Welaka, under a cooperative agreement between the Commission and the University of Florida. A portion of the expense is borne by each agency. The specific purpose of this study is to determine the palatability and nutritional value to quail of seed produced by plants useful to the farmer for erosion control, cover crops, soil builders, pasture, and so forth. Information that has resulted from this study will be of tremendous practical value to the Commission in advising farmers and other land owners interested in improving conditions for quail.

## **Gulf Hammock Wildlife Investigation**

This project was begun in October, 1949, and was designed to serve as a vehicle for financing a long term investigation project accompanying wildlife management developments on the Gulf Hammock Wildlife Management Area. Among its duties are included the determination of the abundance of deer and turkey on the area, making recommendations for hunting or control of hunting of these species, investigating annual game food conditions, and keeping records of annual game kill and hunter reaction. Since this project was begun, excellent information has been obtained relative to these subjects.

One very important phase of the research conducted on this project to date was the investigation of the grey squirrel. This study was conducted by a graduate student of the University of

Florida, under a cooperative agreement between the Commission and the University, and was continued for one year. During the one year of this squirrel study it appears quite likely that more useable management data relative to the grey squirrel has been accumulated than ever before. Of particular importance is an excellent diagnosis of the reasons for the apparent migration of squirrels just prior to the 1949-1950 hunting season, and their reappearance shortly after the first of January. Apparently, there was no disappearance of squirrels at all. They were present throughout the hunting season, but, due to the shortage of acorns and other mast, were not active in food gathering activities, and were thus not observed or killed by the hunters. Squirrel hunting success is as directly correlated with abundance of acorns as it is with abundance of squirrels.

### **Gulf Hammock Wildlife Development**

Among the activities on this project are fence, road, and bridge maintenance and construction, and the preparation of turkey food plots. This project was begun in October of 1949. Sites have been selected for 15 of the 20 proposed turkey food clearings; eight of the food plots have been cleared with a bulldozer, fenced and planted; most of the 60 miles of fence damaged by the hurricane of September, 1950, has been repaired; more than 50 miles of the road has been cleared of fallen trees that resulted from the hurricane; and all of the developments and installations of the Gulf Hammock Wildlife Management Area have been maintained in good order.

One trained wildlife biologist is employed as leader of this project. He is assisted by one Forestry graduate from the University of Florida, and one untrained local man. All project personnel are available for assistance with law enforcement work, under an arrangement whereby time spent on law enforcement work is made up by other wildlife officers assisting with development work. This arrangement is necessary because of the fact that, under the terms of the Pittman-Robertson Act, funds allocated to states cannot be used for law enforcement.

The operation of this project and the annual Gulf Hammock hunt proceeded in a very satisfactory manner in spite of considerable antagonism in the beginning from minor elements of the population of Levy County, and indications are that sadly depleted deer and turkey populations again can be restored to their former abundance.



## **Eglin Field Deer Investigation**

The Eglin Field Deer Investigation is designed principally to determine the status of the Eglin Field deer herd in relation to the carrying capacity of the range and to supply recommendations for the most satisfactory management of the herd. An important aspect of the study will be investigations of the effect on deer of the screw worm.

It appears highly possible that the immediate and future condition of the deer herd, particularly on bombing ranges or similar danger areas where hunting cannot be permitted, would be greatly improved if a portion of the deer were removed—perhaps by trapping for restocking other areas in the state. With this thought in mind permission has been granted by the Air Force authorities for the Commission to trap 150 deer in 1951 for restocking purposes.

Work was begun on this project on July 1, 1950. The project leader spends half his time on deer research and half his time on deer trapping as assistant leader of the deer and turkey restoration project.

## **Collier County Land Acquisition**

Approximately 300,000 acres in northeastern Collier County are being considered for purchase by the Game and Fresh Water Fish Commission for development as a wildlife management area, provided that satisfactory arrangements for the purchase of these lands can be worked out with the landowners. If this area is purchased, it will be maintained in its present state as a wilderness hunting area.

Proposed management plans for the area revolve around more adequate protection of existing game stocks, so that the presently reduced deer, turkey, bear, and alligator populations can be restored to their former abundance.

## **Guano River Land Acquisition**

A tract of approximately 5,000 acres in St. Johns County, including approximately 1,400 acres of salt water marsh, is being considered for purchase as a public duck hunting area. Negotiations are under way with the owners of this land for its purchase or lease. If this area is acquired, a dike will be constructed across the marsh and water control structures will be built which will permit fresh water to be retained on the marsh and will, conse-



quently, greatly improve the marsh as waterfowl habitat. A portion of this area will be set aside as a public hunting ground, and a portion as a waterfowl refuge.

### **Steinhatchee Wildlife Management Area Fencing and Development**

This project was begun in November, 1950. Among its principal activities are the construction of 33½ miles of fence on the Steinhatchee Wildlife Management Area, the construction of four checking station buildings for conducting the Steinhatchee Hunt, the maintenance of an additional 66 miles of existing fence, and conducting game habitat improvement activities.

One trained wildlife manager and one untrained local man are employed on this project. Besides their actual development activities, they are responsible for information relative to game populations, annual game kill, and for recommendations for conducting the annual hunt. As with the Gulf Hammock project these men are available for law enforcement work.

### **Florida Wildlife and Game Kill Inventory**

There is an acute need in modern wildlife management for accurate information concerning game populations and hunter activities. Information available at the present time in the State of Florida is meager, and, at best, unreliable. The present study is designed to determine the method or methods of inventory most applicable to the state, and to set up a permanent system of annual inventory of game populations, game kill, hunter sentiment regarding controversial issues, and hunter activities. Preliminary work on this project was begun in November 1950.

Table 1.

#### **PLANNED EXPENDITURE OF FEDERAL AID FUNDS During the Fiscal Years of 1948-49, 1949-50, and 1950-51**

	1948-49 <sup>1</sup>		1949-50		1950-51	
	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent
Coordination.....	\$ 6,380.00	3.6	\$ 12,196.50	7.6	\$ 13,798.40	6.4
Surveys and Investigations	19,182.70	10.9	39,466.39	24.7	36,393.02	16.8
Development <sup>2</sup> .....	69,957.43	39.9	54,592.39	34.2	87,808.50	40.7
Land Acquisition.....	79,994.96	45.6	53,572.90	33.5	78,000.00	36.1
Total.....	\$ 175,515.09		\$ 159,828.18		\$ 215,999.92	

<sup>1</sup> The figures for 1948-49 and 1949-50 are approved project totals and very nearly approach the actual expenditures. The figures for 1950-51 are approved project totals plus estimated costs of new projects contemplated.

<sup>2</sup> \$43,452.20 of 1948-49 Development Fund was for fence construction on lands purchased or leased.

# FISH MANAGEMENT DIVISION

**JOHN F. DEQUINE, Chief**

**C. E. HALL, JR., Assistant Chief**

## FISH MANAGEMENT AREAS

### AREA A

**Counties:** Bay, Calhoun, Escambia, Franklin, Gadsden, Gulf, Holmes, Jackson, Jefferson, Leon, Liberty, Okaloosa, Santa Rosa, Wakulla, Walton, Washington

**Supervisor:** F. G. Banks, Wewahitchka

#### **Projects:**

Area Fish Management Assistance  
Wewahitchka Fish Management Station  
Sam L. Britt, Supt.  
Blackwater Fish Management Station  
Sam L. Britt, Supt.  
Willie Carr, Custodian

### AREA B

**Counties:** Alachua, Baker, Bradford, Citrus, Dixie, Gilchrist, Hamilton, Lafayette, Levy, Madison, Marion (half), Sumter, Suwannee, Taylor, Union

**Supervisor:** No supervisor at present

#### **Projects:**

Area Fish Management Assistance for counties W. of Suwannee River temporarily provided by Area A Supervisor; for counties E. of Suwannee River by Area C Supervisor

### AREA C

**Counties:** Clay, Duval, Flagler, Lake, Marion (half), Nassau, Orange, Putnam, St. Johns, Seminole, Volusia

**Supervisor:** Barry O. Freeman, Welaka

#### **Technicians:**

Melvin T. Huish  
Delbert L. Taber  
George Horel

#### **Projects:**

Area Fish Management Assistance  
St. Johns River Fish Management Station  
Rough Fish Control

### AREA D

**Counties:** Brevard, Charlotte, De Soto, Hardee, Hernando, Hillsborough, Manatee, Osceola, Pasco, Pinellas, Polk, Sarasota.

**Supervisor:** E. T. Heinen, Lakeland.

**Technicians:** Harold L. Moody; William Ray Holley.

#### **Projects:**

Area Fish Management Assistance  
Rough Fish Control Units  
Winter Haven Fish Management Station  
R. G. Garrett, Supt.  
J. T. Cauley, Truck Driver  
Francis Weston, Laborer

### AREA E

**Counties:** Broward, Collier, Dade, Glades, Hendry, Highlands, Indian River, Lee, Martin, Monroe, Okeechobee, Palm Beach, St. Lucie

**Supervisor:** Don R. Luethy, Okeechobee

#### **Technicians:**

William R. McLane  
Harry M. Frish

#### **Projects:**

Area Fish Management Assistance  
Okeechobee Fish Management Station  
Rough Fish Control

# FISH MANAGEMENT DIVISION



JOHN F. DEQUINE  
*Chief Fisheries Biologist*

CHARLES HALL  
*Assistant Chief Fisheries Biologist*

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# FISH MANAGEMENT

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JOHN F. DEQUINE

THE Fish Management Division is charged with the responsibility of carrying out the Commission's policies pertaining to the management of fish and fisheries and other resources of Florida's fresh waters. Its objectives are two-fold: (1) to find and apply practical methods of improving the sport fisherman's catch, with particular emphasis on the black bass, and (2) to find methods of utilizing Florida's fresh water resources on a sustained yield basis for the maximum benefit of all of the State. Both of these aims are long-range in scope and will require many years of technical effort and a broad program of public education before they can be realized.

In the face of Florida's expanding resident and tourist population, and the increase in the interest in fishing for recreation, fishery stocks over the last few years have been under greater angling pressure than ever before. While Florida's fresh water fishing is excellent compared to that found elsewhere, and no permanent damage to fish population is anticipated from recreational fishing, the harvestable surplus of easily caught fish must not only be maintained but increased. The increased interest in fishing for pleasure has been emphasized by the recent jump in the number of fishing camps established and other services provided for the angler. It now comprises a sizeable industry directly or indirectly affecting the livelihoods of thousands of citizens. Surveys by interested organizations have placed the value of business generated by Florida's fresh water sport fishing at from 100 to 250 million dollars per year. Those charged with the administration of an industry of this scope cannot afford to sit back and take a *laissez-faire* attitude, but must supply considerable thought and effort to increasing production. Fortunately, Florida's Commission

is cognizant of this fact and supports an aggressive program combining research, experimentation and practical management of its fisheries, based on the same principles which have resulted in increased yields of agricultural and forest products in recent years.

In general, the activities of the Fish Management Division are separated into four categories:

1. Technical assistance on fish management problems to individuals, groups and organizations.
2. Fish culture and distribution.
3. Rough fish control and fish population surveys.
4. Specific experimental projects and fisheries surveys.

Superimposed upon these activities is the program of educating the interested public in fish conservation and management, which is accomplished through public appearances by trained and experienced fishery technicians, educational articles in popular publications, and entertainment of interested groups in areas in which work is being conducted.

As 7.7 percent of the Commission revenue was expended during the biennium on this entire fish management program, results and data obtained are presented in considerable detail in this report.

### **Technical Fish Management Assistance**

The recently initiated program providing technical assistance and advice on fish management problems is carried out under a program whereby the entire state is divided into five Fish Management Areas, each of which is in the charge of an experienced fisheries biologist, having the title of Fish Management Area Supervisor who has direct charge of all Fish Management activities in his area. Members of the technical staff are well-trained and experienced, and all of them enjoy good standing in such professional societies as the American Fisheries Society, the American Society of Ichthyologists and Herpetologists, the North American Wildlife Society, the Florida Academy of Sciences and others. Scientific reports have been published in national journals on Florida's fresh water fisheries, and a number of other reports have been written for the Commission's use. A complete listing of these reports is found at the end of this section. The establishment of a technical fisheries library at the Tallahassee office enables fishery workers to keep up with developments in other areas of the country and of the world.

**Table 1.**  
**DISTRIBUTION OF FINGERLING FISH BY COUNTY**

	1949		1950	
	Bass	Bream	Bass	Bream
Alachua.....	13,000			
Baker.....				
Bay.....	1,500	19,000		134,500
Bradford.....			28,000	
Brevard.....			24,000	
Broward.....				
Calhoun.....		14,850	4,000	57,500
Charlotte.....				
Citrus.....	36,000	14,000	62,060	
Clay.....	44,000	4,000	7,000	
Collier.....				
Columbia.....	5,000			
Dade.....				
De Soto.....				
Dixie.....				
Duval.....	18,500		5,550	
Escambia.....	2,000	28,150	5,250	92,650
Flagler.....				
Franklin.....	1,500	9,000	2,000	31,000
Gadsden.....	1,650	19,500	1,250	59,500
Gilchrist.....				
Glades.....				
Gulf.....	500	263,500		205,998
Hamilton.....				
Hardee.....				
Hendry.....				
Hernando.....			12,000	
Highlands.....	22,000			
Hillsborough.....	42,850	1,600	30,000	
Holmes.....		34,000	450	73,000
Indian River.....				
Jackson.....	3,000	34,450		66,500
Jefferson.....	1,544	18,000		60,000
Lafayette.....				18,000
Lake.....	74,260		34,500	
Lee.....				
Leon.....	1,710	23,000	6,050	55,500
Levy.....			10,000	
Liberty.....	1,500			5,000
Madison.....				
Manatee.....	17,000			
Marion.....	11,700		15,000	
Martin.....	1,000			
Monroe.....				
Nassau.....			9,400	
Okaloosa.....	1,000	28,375	3,900	109,700
Okeechobee.....				
Orange.....	42,500		42,000	
Osceola.....	10,500			
Palm Beach.....	7,000			
Pasco.....	9,840		5,100	
Pinellas.....			106	
Polk.....	75,450	25,000	67,700	



**Table 1.—Continued**  
**DISTRIBUTION OF FINGERLING FISH BY COUNTY**

	1949		1950	
	Bass	Bream	Bass	Bream
Putnam.....	27,500	4,000	25,160	.....
St. Johns.....	.....	.....	.....	.....
St. Lucie.....	.....	.....	.....	.....
Santa Rosa.....	2,000	32,600	4,050	135,540
Sarasota.....	6,000	.....	12	.....
Seminole.....	37,000	.....	24,500	.....
Sumter.....	9,000	.....	12,000	50,000
Suwannee.....	.....	36,000	.....	59,000
Taylor.....	.....	2,000	.....	.....
Union.....	.....	.....	.....	.....
Volusia.....	10,000	.....	24,000	.....
Wakulla.....	1,500	18,000	.....	28,400
Walton.....	1,250	18,000	2,620	57,500
Washington.....	1,250	40,050	2,500	142,000
Totals.....	542,004	687,075	470,158	1,441,288

The areas involved, the headquarters for each area, the organization, personnel and projects are listed in the organization chart, Figure 1. Supervisors and their assistants are available to all individuals, groups and organizations who desire assistance and advice in any phases of fresh water fishery problems including the inspection and improvement of fishing waters, fish stocking, bait minnow culture, fish rescue, water hyacinth and other aquatic weed control, fish mortality and pollution, fish identification, rough fish control, fish tagging and others.

This program of providing public assistance and advice on these matters was initiated at the demand for these public services which has arisen in recent years, as a result of the education of the public to the fact that waters can be managed under the direction of trained and experienced experts to provide better fishing, and to help solve other problems requiring the services of a biologist. Since its inception in late 1950, the program has met with considerable success. Assistance has been given to more than eighty groups and individuals on the intensive management of small ponds or lakes for fishing. A number of persons have been advised on the best methods of raising bait minnows, and several groups have been provided assistance in carrying out control of water hyacinths. Notable among the latter was the supervision and planning of the eradication of the water hyacinths from Lake

Talquin, a large impoundment near Tallahassee, which is gradually being rehabilitated after being almost choked out by this pest plant. It should be emphasized that the Commission does not at present have the funds to provide active control of water hyacinths but can supply technical assistance to groups who wish to undertake control themselves. A number of instances of fish mortality were investigated, and where possible, recommendations made concerning ways to avoid future such happenings. Several ponds and lakes throughout the state which were renovated or reclaimed by the Division in cooperation with local organizations are now producing good fishing. Among these are Lake Wire in Lakeland and Lake Ella in Tallahassee which have been set aside for children's fishing lakes. Several other waters have been renovated, stocked, and will be ready for fishing sometime during 1951.

### **Fish Culture and Distribution**

Fingerling fish for stocking purposes are produced at the Commission's hatcheries located at the Blackwater Fish Management Station near Holt, the Wewahitchka Fish Management Station at Wewahitchka, and the Winter Haven Fish Management Station at Eagle Lake, and are distributed over the whole state. In addition, numbers of fish are often obtained from the hatchery of the U. S. Fish and Wildlife Service at Welaka, with which a cooperative agreement is in effect. Most of the fish are released in public waters on application from sportsmen's groups, civic organizations, and interested individuals. Recently, however, a program has been originated under which recently constructed or renovated private waters may receive an initial stocking, and waters which have been analyzed and recommended for stocking by a fishery technician of the Fish Management Division, the U. S. Soil Conservation Service, or the U. S. Fish and Wildlife Service may receive fish. This departure from previous policy (which limited stocking to public waters) is based on the Commission's objective of providing fishing for an increased number of fishermen. It is felt that encouragement of the management of small bodies of water by private individuals and groups will not only provide better fishing for them but will reduce pressure on public waters.

### **Blackwater Fish Management Station**

The Blackwater Fish Management Station is located in the Blackwater Forest between Holt and Munson, in Santa Rosa County. The hatchery and surrounding area (including a large

deer corral) is under a 19-year lease from the Florida Forest Service, which in turn has leased the area from the U. S. Department of Agriculture, which holds the title to it, the facilities having been constructed in the late 1930's by the Resettlement Administration, a Federal agency. An impoundment of approximately thirty acres supplies water by gravity to the six 1.75-acre ponds, which in turn drain into a tributary of the Blackwater River. The productive pond area of 10.5 acres is stocked with brood bluegills and shellcrackers in the winter and fertilized and managed until about June. At this time the ponds are partly drawn down and the first crop of fingerlings removed by seine. Brood fish are then returned, fertilizing resumed, and by September or October the second crop of young bream is ready for distribution. During the last two years, fry largemouth bass have been obtained from the U. S. Fish and Wildlife Service and reared to fingerling size in two of the ponds at Blackwater. This program of raising bass also at this hatchery has met with widespread approval in western Florida and will be continued.

Buildings and equipment include two residences, one garage and storage barn, and one set of concrete holding pools, plus a Jeep, a mower, and other necessary tools and nets. During this biennium an accurate system of counting fish produced at this hatchery was installed for the first time, whereas rough estimates only had been used to measure production in past years. Comparison of past and present production records at this station give the impression of higher yield in previous years, but it is believed that these higher figures are due solely to over-estimation, as the number of truckloads of fish and waters stocked has steadily increased.

Data on fish stocked from the Blackwater Fish Management Station may be found in Tables 1 and 2.

Costs of operating this Station during the biennium were \$12,978.57, \$9,041.83 of which was expended for salaries and labor. One custodian is stationed here to maintain and look after the station property, and local labor and personnel from other Fish Management projects assist in the removal of fish.

### **Wewahitchka Fish Management Station**

The Wewahitchka Fish Management Station is located in Gulf County just northeast of Wewahitchka, adjacent to the famed Dead Lakes, into which most of the production of this hatchery goes. The productive area of this hatchery is one pond of approximately

four acres which was re-graded and renovated in early 1950 at a cost of \$1,988.86. In addition to this work, two concrete catch basins were constructed by Commission personnel with materials provided by the Dead Lakes Sportsmen's Association, increasing the facility of removing the fish. An additional pond of approximately three acres is present, but due to the difficulty in managing water levels and lack of funds for renovation, this pond is not used at present. Attempts are made to produce two crops of bream annually at this station, but as the draw-down of the major pond depends upon the water level in the adjacent Dead Lakes, it is often impossible to harvest more than one crop of fish, the bottom of the pond being considerably below high water levels in the Dead Lakes.

Buildings and equipment at this station include two residences, one barn and miscellaneous storage buildings, one pickup truck, and the Commission's large distribution truck which distributes all of the west Florida fish. Also located at this station is the Fish Management Supervisor for Area "A" and the Superintendent of both the Blackwater and Wewahitchka Fish Management Stations.

Data on fish stocked from the Wewahitchka Fish Management Station may be found in Tables 1 and 2.

Costs of operating this station and related projects during the biennium, including the construction costs mentioned above, were \$15,621.39, \$5,892.00 of which was for salaries and labor.

### **Winter Haven Fish Management Station**

The Winter Haven Fish Management Station is located about two miles southeast of the town of Eagle Lake in Polk County. The productive water area of this station consists of one lake of approximately 50 acres which receives its water supply from an adjacent drainage canal. Bass only are raised at this station, between 1500 and 2000 brood bass being placed in the lake each winter. The fingerling bass are caught by seine, usually from February through July, after which the lake is drained, allowed to dry out thoroughly and then prepared for the following season. Principal problems of fish production at this station include the pollution of the water supply by a local citrus processing plant, an inadequate volume of water, and a heavy growth of weeds which requires constant maintenance to control. Hurricane winds in 1949 necessitated the almost complete rebuilding of one storage house.

Buildings and equipment at this station include the Superin-

**Table 2.**  
**DISTRIBUTION OF FISH BY HATCHERY**

HATCHERY	1949			1950		
	Bass	Bream	Truckloads of Fish	Bass	Bream	Truckloads of Fish
Winter Haven.....	457,054		93	438,088		63
Blackwater.....	9,000	425,075	31	31,370	1,062,790	27
Wewahitchka.....	150	262,000	5		378,498	2
Welaka.....	75,800		2	700		1
			1949			1950
Total Number of Waters Stocked.....			299			326

tendent's residence, one storage barn and garage, a battery of four concrete holding pools, and partial use of a small canal for holding brood fish. A distribution truck, power mower, and other necessary equipment and nets are stored here. This station also acts as the headquarters for the Rough Fish Control projects and is the location for the preparation and repair of equipment used on these projects.

Data on fish stocked from the Winter Haven Fish Management Station may be found in Tables 1 and 2.

Costs of operating this station during the biennium were \$23,-632.23, \$16,180.09 of which were for salaries and labor. A Superintendent, a truck driver and one laborer make up the complement of this station's personnel.

### Live Fish Exhibits

Another activity handled by personnel of all the Fish Management Stations is the staging of live fish exhibits at various County and State Fairs and other occasions. This activity has increased tremendously during this biennium and entails considerable expense and effort. Seventeen such exhibits were made during 1949 and twenty-one in 1950. This compares with six made in 1947 and nine made in 1948.

Fish for these exhibits are generally obtained by seines and nets in the wild during the fair season and transported to the Fish Management Stations where they are held until needed. Lake Okeechobee, Lake George, Lake Apopka and the large lakes in the Kissimmee Valley have all contributed fish for these exhibits.



As the mortality of these fish is extremely high, it is necessary to use a new lot of fish for each exhibit. Attempts to reduce the high mortality rate by chemical treatment have so far been unsuccessful. Between 75 and 100 adult bass, bream and other mixed species are required for each exhibit, with the exception of the Tampa State Fair, which sometimes requires as many as 1,000.

### **Rough Fish Control Operations and Fish Population Surveys**

The rough fish control operations constitute one of the most interesting phases of the Fish Management Division's work. These operations are designed principally to remove large numbers of undesirable rough fish from many of the more popular fishing waters, where it is felt that such removal will aid in producing better fishing. The operations are carefully studied with complete records kept on each catch, and constitute a major portion of the basic inventory of fishery stocks which is badly needed for future management.

The Division now has two completely equipped seining crews engaged in this work. Each crew is equipped with approximately 800 to 1,000 yards of seine, a truck, and the necessary power launches and small boats, and is under the constant supervision and direction of a Fish Management Technician. Fishermen are recruited from local citizens who operate the equipment and receive as compensation  $\frac{3}{4}$  of the proceeds from the sale of catfish and other rough fish. One-fourth of the proceeds is returned to the Commission to help defray costs of operating, maintaining and supervising the equipment and activities. As is the case with such seining in other waters, all game fish are returned immediately from the net, a number of them weighed and measured, and an accurate count kept of all fish by the supervising technician. All catfish, gar, gizzard shad, suckers, and other rough species are removed from the waters and sold to licensed fish dealers, or in the case of gar and gizzard shad, to fertilizer or other rendering companies.

While lack of funds has prevented a complete study of the effects of this rough fish removal on fishing in all of the waters studied, it has been possible to denote some beneficial effects from this work already. Several lakes have shown an increase in the percentage of game fish found following such operations and growth of fish has been bettered. As all lakes vary considerably



in content and composition, it is necessary to discuss each lake individually and to interpret the data obtained on the fish populations for each one. Rough fish control operations are usually performed in lakes where use of a haul seine is practicable and at the request of sportsmen's clubs, chambers of commerce, and other civic organizations. Numbers of interested sportsmen regularly visit the operations, and are invariably astounded at the amounts of fish contained in most of the waters. While most of this work has been performed during this biennium, some data are included on work done in the previous biennium, as these have not previously been published. Areas of waters were obtained by planimeter from county and city maps, and U. S. Coast and Geodetic Survey charts.

### LAKE APOPKA

Lake Apopka, Florida's fourth largest fresh-water lake, has received considerable attention in the matter of rough fish control and other experimental work. Seining operations under Division supervision have been conducted during three separate periods, October-December 1947, July and August 1948, and December 1949 through March 1950. In addition to surveys of the fish population and control of rough fish, an intensive study of tagged black bass was conducted, and experimental gill nets reported on in Table 19 have been operated. Results of the tagging studies were compiled in a special scientific report referred to at the end of this section.

Initial work in 1947 indicated an average fish population somewhat heavy on the rough side, as the latter composed almost 65 percent of the total weight. However, a phenomenal change took place in the population during the next two years, which started soon after the elimination of hyacinths from Lake Apopka by the Apopka Sportsmen's Association. While the average haul took approximately 900 pounds in 1947, by July 1948 it had jumped to 2,400 pounds and then to almost 9,000 pounds in the winter of 1949-50, indicating a huge increase in the total fish population of Lake Apopka. The composition also changed considerably, the game fish populations increasing, according to the studies, from 35 percent in 1947 to 57 percent in 1948 and to 70 percent in 1949-50.

This drastic change in Lake Apopka was attributed to several factors. First, and probably most important, was the increase in basic fertility of Lake Apopka, which was attributed to the decay and decomposition of the water hyacinths and other aquatic vege-

**Table 3.**  
**COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS**  
**DETERMINED BY HAUL SEINE SURVEY FOR THREE SEPARATE**  
**PERIODS IN LAKE APOPKA**

Name of Waters.....	Lake Apopka					
County.....	Lake and Orange					
Approximate area.....	49.2 sq.mi.—31,488 acres					
Ave. depth surveyed (ft.)	5-14		3.5-12		5-13	
Bottom type.....	Mud and sand		Mud and Sand		Sand and mud	
Date of Survey.....	Oct.-Dec. '47		July-Aug. '48		Dec. '49-Mar. '50	
Length of seine (yds.)....	1,000		1,500		800-900	
Minimum mesh (stretched)	3½ inches		3 inches		3 inches	
Species Composition	Pounds Taken	Percent- age	Pounds Taken	Percent- age	Pounds Taken	Percent- age
Largemouth Bass.....	2,404	5.9	3,498	11.2	13,772	5.7
Black Crappie.....	1,652	4.0	4,123	13.2	49,361	20.4
Bluegill.....	2,517	6.1	4,277	13.7	62,336	25.7
Shellcracker.....	3,737	9.1	5,711	18.3	49,637	20.5
Redbreast.....					45	
Miscellaneous Sunfish....	4,257	10.4	18	0.1	13	
Chain Pickerel.....			7		168	0.1
Channel Catfish.....						
White Catfish.....			241	0.7	2,648	*1.1
Speckled Bullhead.....	903	2.2	5,629	18.1	22,149	9.1
Yellow Bullhead.....			4		32	
Longnose Gar.....	7,141	17.4	3,943	13.0	11,789	4.9
Other Gar.....	45	0.1	582	2.0	425	0.2
Mudfish.....	98	0.2	135	0.4	1,173	0.5
Gizzard Shad.....	8,209	20.0	1,773	5.7	25,767	10.6
Chub Sucker.....	10,105	24.6	1,081	3.5	2,173	0.9
Golden Shiner.....			49	0.1	830	0.3
Total Fish Taken.....	41,068	100	31,071	100	242,318	100
Number of Hauls.....	46		13		27	
Ave. Pounds per Haul....	892		2,390		8,975	
Pounds Taken per Acre..	1.3		1.0		7.7	
Pounds Rough Fish						
Removed.....	26,501		13,437		66,986	
Pounds Rough Fish						
Removed per Acre.....	0.8		0.4		2.1	

tation killed in 1948. The increase in plankton and algae during this period converted Lake Apopka from a clear to a cloudy lake, the clouding caused by minute microscopic plants and animals which form the basic food for all fish. Other contributing factors were the low rainfalls and water levels in Lake Apopka, which did not allow sufficient normal dilution to nullify the effects of the accumulated deposits of other organic discharges from citrus processing plants and sewage disposal units in the area, and to two

extremely warm winters which were apparently not cool enough to inhibit the growth of these organisms.

Sport fishing success in Lake Apopka also followed an unusual cycle during this period. It went from fair in 1947 to extremely poor during most of 1948 and 1949, recovering early in 1950 and producing record catches of crappie, shellcracker, and black bass, a condition which has existed throughout 1950. While it is impossible to predict the behavior of fish populations with absolute certainty, observations indicate that the population of Lake Apopka reached an all-time high during 1950 and may gradually level off and provide good fishing for several more years, although perhaps not the phenomenal success that has been enjoyed during 1950. Amounts of fish handled and composition of the populations by species is reported on for the three separate study periods in Table 3. While no claims are made at present that the operation of the rough fish control unit had any significant effect on the subsequent changes in Lake Apopka's fish population, it is quite evident that the seining operations that occurred at least had no harmful effect.

#### LAKE PARKER

Lake Parker, a 2,082 acre lake located in the City of Lakeland in Polk County, has also received considerable attention from the rough fish control unit. Control operations were requested by the Polk County Sportsmen's Association and took place during seven months in 1949 and 1950. A total of 254,610 pounds of rough fish were removed from Lake Parker during the 7 months period, but no **significant** changes could be denoted in either the composition nor the quantity of fish handled during the entire period. However, a number of sports fishermen reported better catches following the control operations, and the average sizes of some species, particularly the speckled bullhead, were considerably larger at the end of the period. It is quite possible that the thinning which took place during the 1949 removal of some 63,300 pounds, or 30 pounds of catfish to the acre was responsible for the increased growth rate by this species. Dominant among the game fish of Lake Parker is the black crappie, constituting the major piscivorous (or fish-eating) species to be found. In the presence of this high crappie population, bass made up only a small part, a condition noted in other lakes examined. Game fish make up an average of about 34 percent of the total weight of adult fish to be found. Unless control of the huge crappie population is desired by local sports-

men, the chances that Lake Parker will ever become a good bass fishing lake are remote. Annual operations are planned for this lake, however, to keep track of the changing populations and to determine whether further control work is effective. Complete data on monthly composition of adult fish populations as determined by haul seine surveys may be found in Table 4.

### LAKE THONOTOSASSA

Lake Thonotosassa, a 768 acre lake located in Hillsborough County, was the site of a short period of operations in March and April 1950. Lake Thonotosassa was formerly noted as an excellent fishing lake, particularly for black crappie, and was used extensively by citizens of Tampa, Plant City, and other nearby communities. In about 1947 water hyacinths almost completely covered this lake and the first step in its rehabilitation was taken when local interests accomplished the elimination of the hyacinths. However, fishing remained poor following this elimination, and several organizations, notably the Thonotosassa Chamber of Commerce and the East Hillsborough Sportsmen's Association, requested that attention be paid to the lake.

The survey revealed several outstanding conditions in Lake Thonotosassa. First, only 6 percent of the total weight of fish taken during the operation was in game fish, by far the largest part of the population being composed of catfish, gar and other rough fish. The very few bass taken were all relatively large bass, averaging about 4 pounds in weight, a condition indicative of an unbalanced bass population. Average sizes of crappie were small, indicating that growth was stunted. Large channel catfish, making up almost 60 percent of the population, were dominant, followed by the speckled bullhead (16 percent) and garfish (15 percent). Checks with small-mesh seines indicated that natural reproduction by bass was non-existent. Apparently game fish populations were being crowded out and preyed upon to such extent by rough fishes that the restoration of good fishing without interference by man could be accomplished only over a very long period, if ever.

A total of 4,251 pounds of rough fish, or 5.5 pounds per acre, were removed. In May, 1950, some 14,000 largemouth bass fingerlings, or approximately 20 per acre were stocked in Thonotosassa in an attempt to re-establish the population of bass in this lake. Further survey work will be done in the spring of 1951 to see whether this stocking and control has been effective, and to remove addi-





tional rough fish. The outcome of these contemplated studies is being watched with considerable interest, as the effect of this control and stocking program will be the first recorded thoroughly in an instance of this type. Complete data on the composition of adult fish populations as determined by haul seine surveys may be found in Table 5.

**Table 5.**  
**COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS**  
**DETERMINED BY HAUL SEINE SURVEYS IN THREE**  
**FLORIDA LAKES**

Name of Waters.....	Lake		Johns Lake		Lake Louisa	
County.....	Thonotosassa Hillsborough		Orange		Lake	
Approximate Area.....	768 acres		2,714 acres		3,200 acres	
Average Depth Surveyed (ft.).....	4.5-8		8-12		7-8	
Bottom Type.....	Hard Sand		Sand and Mud		Hard Sand	
Date of Survey.....	Mar. 27-Apr. 7, 1950		Nov.-Dec, 1950		Jan.-Feb., 1950	
Length of Seine (yards).....	800		835		860	
Minimum Mesh (stretched).....	3 inches		3 inches		3 inches	
Species Composition	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
Largemouth.....	84	1.9	1,655	3.1	112	2.2
Black Crappie.....	135	3.0	1,377	2.6	263	5.3
Bluegill.....	40	0.9	5,297	9.9	599	11.8
Shellcracker.....	10	0.2	64	0.1	2	.....
Redbreast.....	.....	.....	.....	.....	.....	.....
Miscellaneous Sunfish.....	2	.....	7	.....	3	.....
Chain Pickerel.....	.....	.....	17	.....	.....	.....
Channel Catfish.....	2,645	58.5	30,606	57.0	3,216	63.3
White Catfish.....	2	.....	2,681	5.0	721	14.2
Speckled Bullhead.....	708	15.7	235	0.4	.....	.....
Yellow Bullhead.....	17	0.3	46	0.1	4	.....
Longnose Gar.....	610	13.5	1,858	3.5	53	1.0
Other Gar.....	43	1.0	443	0.8	88	1.7
Mudfish.....	53	1.2	4	.....	23	0.5
Gizzard Shad.....	11	0.2	9,324	17.4	3	.....
Chub Sucker.....	144	3.2	61	0.1	5	.....
Golden Shiner.....	18	0.4	30	.....	.....	.....
Total fish taken.....	4,522	100	53,705	100	5,092	100
Number of hauls.....	6	.....	25	.....	8	.....
Average pounds per haul.....	754	.....	2,148	.....	637	.....
Pounds taken per acre.....	5.9	.....	19.8	.....	1.6	.....
Pounds rough fish removed.....	4,251	.....	45,288	.....	4,113	.....
Pounds rough fish removed per acre.....	5.5	.....	16.7	.....	1.3	.....



## LAKE KISSIMMEE

Lake Kissimmee is a lake of approximately 53.4 square miles in southern Osceola County and is Florida's third largest fresh-water lake. Control operations were conducted in Lake Kissimmee from March to August in 1949 and between August and November 1950. A number of factors combined to interfere with the success of seining operations in these waters, chief of which was the weather, a period of drought occurring in the 1949 operations and the hurricane season in the 1950 operations. Although the monthly fluctuations in abundance of various species coincide generally with those denoted in Lake Okeechobee and Lake George, it is impossible to draw conclusions on this activity of the fish population, as the work was not constant and was interrupted by the factors mentioned. In general, game fish populations were relatively high, averaging about 50 percent during the two periods, and all game fish appeared to be in good condition. A healthy population of black bass was found with sufficient numbers of all sizes present, particularly during the 1950 studies. Crappie was the dominant game fish, while gizzard shad comprised the largest single species of the rough fish. Monthly compositions of adult fish populations as determined by haul seine surveys may be found in Table 6.

## LAKE TOHOPEKALIGA

Lake Tohopekaliga, a 30.6 square mile lake located adjacent to the city of Kissimmee in Osceola County, received the attentions of the rough fish control unit in November and December, 1948. The studies indicated a fairly good standing population, an average haul of almost 800 pounds being taken. Game fish comprised over 60 percent of the total population, this segment being dominated by the crappie (48 percent). The dominant rough fish was the channel catfish, followed by the gizzard shad. Growth of crappie in this lake was slower than normal, two and three year old fish measuring only 8 to 11 inches in total length. This slow growth is believed to be due to over-crowding, although apparently the over-crowding was not so serious as to cause an unbalanced condition. Most bass taken were small but appeared to be in good condition. Data on the composition of adult fish populations as determined by haul seine survey for Lake Tohopekaliga can be found in Table 7.

**Table 6.**  
**MONTHLY COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS**  
**DETERMINED BY HAUL SEINE SURVEY IN LAKE KISSIMMEE**

Name of Waters.....																	Lake Kissimmee	
County.....																	Osceola County	
Approximate Area.....																	34,203 acres—53.4 sq.mi.	
Average depth surveyed (feet).....	5-10		6-9		7-8		7.5-9		4-9		3-9		4-8		4.5-8		TOTALS	
Bottom Type.....	Sand and Mud		Sand and Mud		Sand and Mud		Sand		Sand and Mud		Sand and Mud		Sand and Mud		Sand			
Date of Survey.....	April, 1949		May, 1949		June, 1949		July, 1949		August, 1950		Sept., 1950		October, 1950		Nov., 1950			
Length of Seine (yards).....	1100		1100		1100		1100		800		800		830		835			
Minimum Mesh (stretched).....	3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches			
Species, Composition	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
Largemouth Bass.....	1,490	4.1	1,165	3.8	1,665	3.7	1,315	4.2	928	6.8	2,405	9.6	1,319	6.6	93	5.5	10,380	5.1
Black Crappie.....	16,315	44.7	7,300	24.4	17,225	38.1	10,800	34.5	810	5.9	1,073	4.3	1,995	10.0	340	20.3	55,858	27.5
Bluegill.....	1,010	2.8	2,050	6.8	6,825	15.1	2,715	8.7	662	4.8	2,251	9.0	1,604	8.0	28	1.7	17,145	8.4
Shellcracker.....	4,485	12.3	3,675	12.3	2,750	6.1	3,840	12.3	2,022	14.7	2,908	11.6	2,274	11.4	148	8.8	22,102	10.9
Redbreast.....																		
Miscellaneous Sunfish.....	2				2		1						1				6	
Chain Pickerel.....	108	0.3	85	0.3	137	0.3	133	0.4	46	0.3	67	0.3	17	0.1	4	0.2	597	0.3
Channel Catfish.....	3,461	9.5	2,061	6.9	2,671	5.9	2,967	9.5	338	2.5	2,259	9.1	4,252	21.4	45	2.7	18,054	8.9
White Catfish.....	1,957	5.4	1,720	5.7	845	1.9	1,031	3.3	441	3.2	1,841	7.4	1,092	5.5	10	0.6	8,937	4.4
Speckled Bullhead.....	539	1.4	682	2.3	1,062	2.3	1,123	3.6	1,707	12.5	1,664	6.7	957	4.9	6	0.4	7,740	3.8
Yellow Bullhead.....	3		1		5		1		11	0.1	38	0.2	4				63	
Longnose Gar.....																		
Other Gar.....	399	1.1	295	1.0	460	1.0	133	0.4	501	3.7	405	1.6	381	1.9	44	2.6	2,618	1.3
Mudfish.....	82	0.2	395	1.3	1,045	2.3	729	2.3	2,202	16.1	2,723	10.9	507	2.5			7,683	3.7
Gizzard Shad.....	4,735	12.9	8,300	27.6	6,450	14.2	4,835	15.4	483	3.5	910	3.6	3,277	16.4	947	56.5	29,937	14.7
Chub Sucker.....	1,010	2.8	1,435	4.8	2,475	5.5	1,280	4.1	3,465	25.3	6,364	25.5	2,252	11.3	9	0.5	18,200	9.0
Golden Shiner.....	900	2.5	850	2.8	1,650	3.6	410	1.3	85	0.6	56	0.2	6		3	0.2	3,900	1.7
Total fish taken.....	36,496	100	30,014	100	45,267	100	31,313	100	13,701	100	24,964	100	19,938	100	1,677	100	203,370	100
Number of hauls.....	16		11		11		13		9		17		16		3		96	
Average pounds per haul.....	2,281		2,728		4,115		2,409		1,522		1,468		1,246		559		2,118	
Pounds taken per acre.....	1.1		0.9		1.3		0.9		0.4		0.7		0.6		i		5.9	
Pounds Rough fish removed.....	13,086		15,739		16,663		12,509		9,233		16,260		12,728		1,064		97,282	
Pounds rough fish removed per acre.....																	2.8	

<sup>1</sup> Includes 2 hauls March 29 and 31, 1949.

<sup>2</sup> Includes 1 haul August 4, 1949.

i Insignificant.

## LAKE CYPRESS

Rough fish control operations took place in Lake Cypress in December 1948 and January and February of 1949. Lake Cypress is another of the Kissimmee chain located in Osceola County with an approximate area of 6.4 square miles. A good standing population was found, the average pounds of fish taken per haul amounting to 1,600. Sixty-eight percent of the total population was composed of desirable game fishes with the crappie dominating (40 percent). Channel catfish was the dominant rough fish (13 percent), but it was encouraging to note that rough fishes were in the minority. Lake Cypress had the best population of bass by compari-

**Table 7.**  
**COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS**  
**DETERMINED BY HAUL SEINE SURVEYS IN FOUR**  
**OSCEOLA COUNTY LAKES**

	Lake Tohopekaliga Osceola		East Lake Tohopekaliga Osceola		Lake Hatchineha Osceola		Lake Cypress Osceola	
Name of Waters.....	Tohopekaliga		Tohopekaliga		Hatchineha		Cypress	
County.....	Osceola		Osceola		Osceola		Osceola	
Approximate area.....	19,533 acres		12,774 acres		9,216 acres		4,096 acres	
Average Depth Surveyed (feet).....	7-13		6-8		5.5-11		6.5-10.5	
Bottom Type.....	Sand and Mud		Sand and Mud		Sand and Mud		Sand and Mud	
Date of Survey.....	1948		1949		1949		1948-49	
	8 Nov.-16 Dec.		15 Aug.-2 Sept.		14 Feb.-18 Mar.		8 Nov.-11 Feb.	
Length of Seine (yards).....	900		1100		900		900	
Minimum Mesh (stretched).....	3 inches		3 inches		3 inches		3 inches	
	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age
Species Composition								
Largemouth Bass.....	693	3.2	750	5.8	2,003	5.2	3,731	7.3
Black Crappie.....	10,745	47.6	5,600	43.5	9,686	25.1	20,375	39.8
Bluegill.....	1,023	4.3	1,435	11.5	6,513	16.9	7,298	14.3
Shelleracker.....	1,956	9.3	240	1.9	3,956	10.3	3,417	6.7
Redbreast.....								
Miscellaneous Sunfish.....					17			
Chain Pickerel.....	4							
Channel Catfish.....	2,655	14.3	1,012	7.8	3,989	10.3	6,814	13.3
White Catfish.....	1,493	6.3	88	0.7	3,783	9.8	3,820	7.5
Speckled Bullhead.....	269	1.0	27	0.2	975	2.5	1,014	2.0
Yellow Bullhead.....					3		15	
Longnose Gar.....			158	1.2				
Other Gar.....	209	1.2	30	0.2	444	1.1	2,200	4.3
Mudfish.....	9		4		453	1.2	177	0.3
Gizzard Shad.....	2,302	12.8	3,200	24.8	3,170	8.2	2,039	4.0
Chub Sucker.....	3		313	2.4	3,152	1.2	229	0.4
Golden Shiner.....	2				451		68	0.1
Total fish taken.....	21,363	100	12,858	100	38,565	100	51,209	100
Number of hauls.....	27		11		19		32	
Average pounds per haul.....	791		1,169		2,031		1,600	
Pounds taken per acre.....	1.1		1.0		4.2		12.5	
Pounds rough fish removed.....	6,942		4,833		16,420		16,388	
Pounds rough fish removed per acre.....	0.4		0.4		1.8		4.0	

son of the lakes studied in the Kissimmee chain, an abundance of all sizes being present and in good condition. Long term rough fish control programs in Lake Cypress did not seem justified under present conditions, although continuous checks should be made. The composition of the adult fish population as determined by haul seine surveys may be found in Table 7.

### **LAKE HATCHINEHA**

Lake Hatchineha, another member of the Kissimmee chain in Osceola County with a surface area of approximately 14.4 square miles, received attention during February and March of 1949. The survey indicated that this was also an excellent lake for game fish, as they comprised almost 58 percent of all fish taken. Again crappie were dominant (25 percent) and high populations of bluegill (17 percent) and shellcracker (10 percent) were also noted. The three species of catfish made up the dominant segment of the rough fish population (23 percent), the gizzard shad approximating 8 percent. The bass population was good, a wide range of sizes being present, and all game fish appeared to be in good condition. Extensive rough fish control operations did not seem justified, although annual checks should be made. Complete data on adult fish populations as determined by haul seine surveys may be found in Table 7.

### **EAST LAKE TOHOPEKALIGA**

East Lake Tohopekaliga, located between Kissimmee and St. Cloud in Osceola County, received attention in August and September of 1949. East Lake appeared to have a good standing population as the average haul made was almost 1,200 pounds of fish. Game fish comprised approximately 62 percent of the adult population, with the crappie dominating (44 percent). Gizzard shad (25 percent) was the major rough species found, followed by channel catfish (8 percent). A desirable bass population was found, composing almost 6 percent of the total weight, individual fish averaging slightly over 2 pounds each. Due to the short duration of operations, no immediate effects were noticed, nor can be expected. Extensive rough fish control operations in East Lake Tohopekaliga at this time did not seem justified in view of the demand for the use of the units in lakes more heavily populated with rough fish. Complete data on the composition of adult fish populations as determined by haul seine survey may be found in Table 7.

**Table 8.**  
**COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS DETERMINED**  
**BY HAUL SEINE SURVEY IN EIGHT POLK COUNTY LAKES**

Name of Waters County Approximate Area	Lake Hartridge Polk County 384 Acres				Lake Howard Polk County 512 Acres				Lake Hollingsworth Polk County 366 acres				Lake Bonny Polk 378 acres		Lake Shipp Polk 250 acres		Lake Deeson Polk 183 acres		Lake May Polk 38 acres		L. Weohyakapka Polk 7,623 acres	
Average Depth Sur- veyed (feet)	7.5-10		9.5-12		8.5-10.5		9-12		5.5-7.5		7.5-8		8-9		11		10		6		4-10	
Bottom Type	Sand and Mud		Mud and Sand		Sand and Mud		Sand and Mud		Mud and Sand		Sand		Sand and Mud		Sand and Mud		Sand		Mud		Hard Sand	
Date of Survey	Nov.-Dec. 1949		Dec. 6-20, 1950		Nov.-Dec. 1949		Dec. 6-22, 1950		Nov. 15-18, 1949		June 22-29, 1950		Nov. 8-14, 1949		Dec. 11, 1950		May 15-16, 1950		Dec. 14-18, 1950		Jan. 21-28, 1948	
Length of Seine (yards)	760		735		760		735		760		720		760		735		750		735		830	
Minimum Mesh (stretched)	3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches		3 inches	
Species Composition	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age
Largemouth Bass	251	2.7	219	3.9	1,918	5.1	1,562	10.8	11	0.1	20	0.1	1,085	10.1	850	17.1	79	6.4	305	3.0	180	13.2
Black Crappie	575	5.9	507	9.2	4,440	11.8	2,009	14.0	23	0.2	315	0.7	1,775	16.6	150	3.0			1,242	12.1	140	10.3
Bluegill	370	3.9	214	3.9	6,160	16.4	1,261	8.8	9		1,075	2.4	1,580	14.7	1,500	30.1	8	0.6	603	5.9	101	7.5
Shellcracker	90	0.9	13	0.2	2,295	6.1	117	0.8			70	0.2	835	8.1	300	6.0	8	0.6	29	0.3	149	11.0
Redbreast																						
Miscellaneous Sunfish																						
Chain Pickerel																						
Channel Catfish	6,344	66.1	1,682	30.5	12,853	34.2	4,407	30.6	232	1.4			71	0.7	270	5.4			858	8.3		
White Catfish	615	6.4	100	1.8	1,222	3.3	114	0.8					589	5.5	6	0.1			35	0.3	372	27.5
Speckled Bullhead	10	0.1	7	0.1	177	0.5	154	1.1			4,370	9.6			11	0.2			2			
Yellow Bullhead																			2			
Longnose Gar																						
Other Gar	4		23	0.4	59	0.2	80	0.5	53	0.3	341	0.8	97	0.9	65	1.3					131	9.7
Mudfish	6	0.1			15		9	0.1	9		99	0.2	11	0.1	9	0.2			600	5.8	7	0.5
Gizzard Shad	1,310	13.7	2,730	49.5	8,150	21.7	4,585	31.8	16,650	98.0	38,837	86.0	4,625	43.2	1,800	36.1	1,150	92.4	6,600	64.1	275	20.3
Chub Sucker	17	0.2	29	0.5	128	0.3	18	0.1					8	0.1	25	0.5			25	0.2		
Golden Shiner			2		142	0.4	83	0.6					1		1				2			
Total fish taken	9,592	100	5,526	100	37,559	100	4,399	100	16,987	100	45,127	100	10,707	100	14,987	100	1,245	100	10,303	100	1,355	100
Number of hauls	4		6		9		8		4		6		4		1		2		2		11	
Average pounds per haul	2,398		921		4,173		1,800		4,247		7,521		2,687				622		5,151		123	
Pounds taken per acre	25		14.4		73.4		28.1		46.4		123		28		20		7		271		.18	
Pounds rough fish re- moved	8,306		4,573		22,746		9,450		16,944		43,647		5,402		2,187		1,150		8,124		785	
Pounds rough fish re- moved per acre	21.6		11		44		18		46.3		119		14		8.7		6		213		.10	



### LAKE DEESON

Lake Deeson, a small lake of approximately 183 acres located in the city of Lakeland in Polk County, was surveyed in May 1950. Because of its small size, it was possible to completely cover Lake Deeson with two hauls of the control seine and it is felt that a representative sample of the adult fish population was obtained. Lake Deeson had an extremely low population of game fish, not quite 8 percent, but was heavily populated by gizzard shad. Bluegill and shellcracker together amounted to only slightly over 1 percent of the total, the shad comprising over 92 percent. Checks with a small-mesh seine indicated that there had been some slight reproduction in bass but no recently spawned bream were found. Additional control efforts are necessary to restore good fishing in Lake Deeson. It is anticipated that further operations will occur in the spring of 1951. Complete data on composition of adult fish populations as determined by haul seine surveys may be found in Table 8.

### LAKE HOLLINGSWORTH

Lake Hollingsworth, another City of Lakeland lake of approximately 366 acres, was surveyed in November of 1949 and June of 1950. As this is another relatively small lake, it is felt that survey operations obtained a fairly representative sample of the adult fish populations. During the 1949 operations game fish were found to be almost non-existent, comprising less than 1 percent of the total population, 98 percent being composed of gizzard shad. Only two largemouth bass were taken, each weighing over 5 pounds, obviously an undesirable situation. After removing almost 17,000 pounds of rough fish, or 46.3 pounds per acre, it was decided to return at a later date to Lake Hollingsworth to see whether that removal had been sufficient to enable game fishes to increase in production. On the return of the crew to this lake in June 1950, it was found that game fish stocks had increased slightly, but that the increase was insignificant. Gizzard shad had decreased somewhat to 86 percent but an increase was noted in the population of catfish. No reproduction was found in bass or bluegill, although the relief occasioned by the removal of gizzard shad in 1949 had apparently been sufficient to allow them to spawn heavily, as young shad were extremely abundant. Almost 44,000 pounds of rough fish, or 119.3 pounds per acre, were removed during the second period, and future operations will be conducted to determine whether this additional removal will result in increased game



fish production and successful reproduction by the few bass and bream found. Complete data on composition of adult fish populations for the two study periods may be found in Table 8.

### **LAKE BONNY**

Lake Bonny, another small lake located in the City of Lakeland in Polk County, was checked during November, 1949. A fairly good population of game fish (50 percent) was found and the game fish were in fairly good condition. Bass were comparatively plentiful and a number of all sizes was found. Gizzard shad composed 43 percent of the rough fish taken. Future operations are planned for Lake Bonny. Complete listing of the adult populations as determined by haul seine survey may be found in Table 8.

### **LAKE HARTRIDGE**

Lake Hartridge, a 384 acre lake located in the City of Winter Haven received attention in November and December of 1949 and November and December of 1950. The 1949 operations indicated a fairly low population of game fish (14 percent). Catfish were the major species (73 percent), while gizzard shad were also numerous (14 percent). Eight thousand, three hundred six pounds of rough fish, or 21.6 pounds per acre were removed in 1949. A slight increase in game fish to 17 percent was found in 1950, along with considerable decrease of catfish (30 percent). However, a considerable increase in the volume of gizzard shad was found. No definite conclusions can be made from this work, but future operations are planned. A complete listing of the composition of adult fish populations as determined by haul seine survey may be found in Table 8.

### **LAKE HOWARD**

Lake Howard, a popular fishing lake in the City of Winter Haven of approximately 512 acres in area, received attention in November and December of 1949 and in December of 1950. The 1949 operations indicated a fish population composed of 40 percent game fish, dominated by bluegill (16 percent). Catfish (38 percent) were the dominant rough fish, followed by gizzard shad (22 percent). A healthy bass population containing many large individuals was noted. The 1950 operations indicated a game fish population of approximately 53 percent, a catfish population which remained about the same (39 percent) and a decline in the gizzard shad to 6 percent.

Lake Howard had received previous attention from rough fish control operations. In about 1945 it was seined and many tons of gizzard shad and catfish removed. At that time no successful natural reproduction of bass was reported in Lake Howard. However, within two years after the early first removal of quantities of rough fish, natural reproduction of bass was noted, presumably due to the relief brought about by the removal of the gizzard shad. Although records are not available for the early seining period, it is believed that Lake Howard has shown steady improvement since seining operations started. Future work will determine this more definitely. Composition of adult fish populations as determined by haul seine survey for the two separate periods may be found in Table 8.

#### **LAKE WEOHYAKAPKA (WALK-IN-THE-WATER)**

Survey operations were conducted in Lake Weohyakapka, a 7,629 acre lake in Polk County, in January 1948. Although a fairly good proportion of game fish was found (42 percent), with the bass dominating (13.2 percent), the total productivity was found to be low, the average haul taking only 123 pounds of all fish. Channel catfish were the major rough fish (27.5 percent), followed by gizzard shad (20.3 percent) and gar (9.7 percent). Due to the low take of rough fish (0.1 pounds per acre), it is not felt that operations were effective in controlling rough fish. Future operations are planned for Lake Weohyakapka. Complete data obtained during this survey is recorded in Table 8.

#### **LAKE SHIPP**

Lake Shipp, a 250 acre lake in the City of Lakeland was surveyed once in December 1950. It was possible only to spend one day in this lake and the high game fish population indicated by the one haul made appeared to make extensive rough fish control unnecessary. However, Lake Shipp will be checked again in future years to watch for any changes in its population structure. Complete data on the fish taken by haul seine in Lake Shipp may be found in Table 8.

#### **LAKE MAY**

Lake May, a 38 acre lake in the City of Winter Haven was seined in December 1950. As Lake May is also a small lake easily covered by seine it is felt that a representative sample of the adult fish population was obtained. A low population of game fish (21 percent) was found, dominated by the black crappie. Gizzard shad (64 percent) was the dominant rough fish. It will be interesting to see

whether the removal of 8,124 pounds of rough fish, or 213 pounds per acre, will result in an improved status of the game fish, although the free movement of fish possible through connection with Lake Howard and other lakes may complicate findings during future operations. Complete data on composition of adult fish populations as determined by haul seine survey may be found in Table 8.

### **LAKE LOUISA**

Lake Louisa is a 3,200 acre lake located near Clermont in Lake County. Operations were conducted in this lake in January and February of 1950. Extreme difficulty was encountered in operating the seine in Lake Louisa because a considerable area of the lake was too deep to net successfully with the gear used. The work done, however, indicated a fair standing population of fish. Game fish comprised only about 20 percent of the total weight of fish taken while catfish accounted for almost 78 percent. Additional rough fish control operations are needed in Lake Louisa, but it is doubtful whether seining of this lake would be economical. Other methods of reducing the catfish population, such as wire traps or pound nets are suggested as a means of accomplishing this. If local sportsmen are favorable to the suggestion, it is felt that this can be accomplished in cooperation with local commercial fishermen. A complete listing of the adult fish population as determined by haul seine surveys may be found in Table 5.

### **JOHNS LAKE**

Johns Lake is a popular fishing lake located near Winter Garden in Orange County with a surface area of approximately 2,714 acres. Water hyacinths had interfered with fishing success in Johns Lake until their eradication by local interests in late 1949. The survey unit operated in this lake in November and December of 1950 and was able to obtain what is felt to be a fairly representative sample of the adult fish population. Johns Lake was found to be low in game fish (16 percent) while catfish made up almost 63 percent of the total. Gizzard shad were also plentiful (17 percent). Only large bass were taken and although these were in fairly good condition, the absence of any small bass corresponding to fingerlings and one-year old fish suggests that natural reproduction had been unsuccessful during the last two years. Johns Lake needs considerable attention before it can be restored as a good fishing lake. Heavy stocking with bass fingerlings is planned for early 1951 to be followed by further control operations. Complete data on composition

of adult fish populations as determined by haul seine survey may be found in Table 5.

### **LAKE COUNTY**

In addition to the work performed in Lake County by the State operated control units, some rough fish control operations were conducted in five large Lake County lakes (Beauclair, Dora, Eustis, Harris, and Griffin) in 1948 and as the results of them were not previously reported on, they are included here. The work in these lakes was done by commercial fishing crews working under contract, the major purpose of the operations being to capture black bass used in the tagging experiment. As only a relatively few hauls were made in each of these lakes and the populations of game fish seemed very high, it is possible only to draw general conclusions from the work conducted, as representative samples of the adult fish populations were obtained only from Lake Harris. Comparatively speaking, however, Lakes Beauclair, Eustis and Harris appeared highest in productivity, while Lakes Dora and Griffin were fair. Plans should be made, however, for occasional control work to be done in all of these lakes and to keep check on the changes in the status of the game fishes. Complete data obtained during these surveys is recorded in Table 9.

### **REX BEACH LAKE**

A brief survey was made by the Rough Fish Control Unit in Rex Beach Lake, a 2,995 acre lake located in the City of Sebring in Highlands County at the request of local officials and sportsmen's organizations. Rex Beach Lake was found to be in exceptionally good balance, there being successful reproduction and a desirable variety of sizes in all game fishes. It did not appear to be supporting a significantly high population of rough fish as only a few pounds of chub sucker (6.5 percent) were taken in the three hauls made. However, a low standing population of fish was indicated by the average haul of only 209 pounds. This condition can be improved only by increasing the basic productivity of Rex Beach Lake by fertilization. Extensive rough fish control operation did not appear justified at this time. Complete data obtained during the operations may be found in Table 10.

### **LAKE JOSEPHINE**

Lake Josephine, a 1,280 acre lake located south of Sebring, also received attention. Operations were considerably handicapped by the presence of water hyacinths, but it is felt that a fairly reliable picture of the adult population was obtained. Further control work

**Table 9.**  
**COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS DETERMINED**  
**BY HAUL SEINE SURVEYS IN FIVE LAKES IN LAKE COUNTY**

Name of Waters.....	Lake Beauclair Lake 1408	Lake Beauclair Lake 1408	Lake Dora Lake 4608	Lake Dora Lake 4608	Lake Eustis Lake 7,232	Lake Eustis Lake 7,232	Lake Harris Lake 17,984	Lake Harris Lake 17,984	Lake Griffin Lake 9,920	Lake Griffin Lake 9,920
Approximate Area (acres).....	11-12	9-11	10-15	9-14	8-15	8-11	7-14	10-11	13-14	10-15
Average Depths Surveyed (feet).....	Hard Sand	Hard Sand	Mud and Sand	Sand and Mud	Mud and Sand	Mud and Sand	Mud and Sand	Sand and Mud	Mud and Sand	Mud and Sand
Bottom Type.....	Jan.-Mar. 1948	August, 1948	Jan.-Feb. 1948	August, 1948	Jan.-Mar. 1948	August, 1948	Jan.-Mar. 1948	August 1948	February, 1948	Aug.-Sept. 1948
Date of Survey.....	1000	1500	1000	1500	1000	1500	1000	1500	1000	1500
Length of Seines (yards).....	2½ inches	3 inches	2½ inches	3 inches	2½ inches	3 inches	2½ inches	3 inches	2½ inches	3 inches
Minimum Mesh (stretched).....										
Species Composition	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age
Largemouth Bass.....	1,028	6.0	2,240	7.3	122	3.2	115	5.1	1,011	1.2
Black Crappie.....	1,625	9.5	2,875	9.4	225	5.8	28	1.3	2,430	2.8
Bluegill.....	2,400	14.1	6,625	21.6	1,130	29.3	268	11.9	50,105	58.0
Shelleracker.....	4,300	25.2	18,000	58.6	1,175	30.4	1,453	64.8	5,404	30.5
Redbreast.....									7,894	44.6
Miscellaneous Sunfish.....									119	0.7
Chain Pickerel.....										
Channel Catfish.....									41	0.2
White Catfish.....									105	0.6
Speckled Bullhead.....	1 174	1.0	137	0.5	1 45	1.2	5	0.2	1 1,415	1.6
Yellow Bullhead.....									28	0.1
Longnose Gar.....	2 3,160	18.6	421	1.4	2 1,048	27.1	275	12.3	1,124	6.4
Other Gar.....			97	0.3			1		6	
Mudfish.....			36	0.1	4	0.1			3	
Gizzard Shad.....	4,308	25.3	215	0.7	107	2.8	5	0.2	6,518	7.6
Chub Sucker.....	44	0.3	70	0.2	4	0.1	1		18	0.2
Golden Shiner.....										
Miscellaneous Freshwater Species.....										
Predatory Turtles.....			75				31			
Non-Predatory Turtles.....	1,828		425		240		66		770	
Total fish taken.....	17,039	100	30,721	100	3,860	100	2,244	100	86,202	100
Number of hauls.....	4		2		2		3		10	
Average pounds per haul.....	4,235		15,361		1,930		748		8,620	
Pounds taken per acre.....	12.1		10.9		0.8		0.5		11.9	
Pounds of rough fish removed.....	7,686		981		1,208		380		11,631	
Pounds of rough fish removed per acre.....	5.5		0.7		0.3		0.1		1.6	

<sup>1</sup> All catfish grouped with most abundant species.

<sup>2</sup> All garfish grouped with most abundant species.

i Insignificant figure.



is indicated for Lake Josephine, but should follow complete eradication of the water hyacinths. Basic productivity is fairly good as indicated by the average haul of 644 pounds, and the condition of game fishes was good. Complete data obtained during this survey is recorded in Table 10.

### LAKE ALICE

Lake Alice, a lake of approximately 20 acres located in Wewahitchka in Gulf County, was seined in May 1950 at the request of local sportsmen, who felt that rough fish control was needed. Game fish composed 47 percent of the total taken, while rough fish, principally chub suckers, made up 53 percent. It is hoped that the re-

Table 10.  
COMPOSITION OF ADULT FISH POPULATIONS AND OTHER DATA AS  
DETERMINED BY HAUL SEINE SURVEYS IN TWO  
HIGHLANDS COUNTY LAKES

Name of Waters.....	Rex Beach Lake Highlands		Lake Josephine Highlands	
County.....	2,995 acres		1,280 acres	
Approximate Area.....	7-13		6-10	
Average Depth Surveyed (feet).....	Sand and Mud		Mud and Sand	
Bottom Type.....	Nov. 21-28, 1950		Nov. 26-29, 1950	
Date of Survey.....	735		735	
Length of Seine (yards).....	3 inches		3 inches	
Minimum Mesh (stretched).....				
Species Composition	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age
Largemouth Bass.....	219	34.9	125	4.8
Black Crappie.....			983	38.2
Bluegill.....	234	37.3	246	9.6
Shellcracker.....	133	21.3	5	
Redbreast.....				
Miscellaneous Sunfish.....			1	
Chain Pickerel.....				
Channel Catfish.....			413	16.0
White Catfish.....			5	0.2
Speckled Bullhead.....				
Yellow Bullhead.....				
Longnose Gar.....				
Other Gar.....			20	0.8
Mudfish.....			27	1.1
Gizzard Shad.....			707	27.5
Chub Sucker.....	41	6.5	42	1.6
Golden Shiner.....			1	
Total fish taken.....	627	100	2,575	100
Number of hauls.....	3		4	
Average pounds per haul.....	209		644	
Pounds taken per acre.....	i		2	
Pounds rough fish removed.....	41		1,215	
Pounds rough fish removed per acre.....	i		1	

i-Insignificant.

Table 11.

**SPECIES COMPOSITION OF ADULT FISH POPULATION AND OTHER  
DATA AS DETERMINED BY HAUL SEINE SURVEY IN LAKE ALICE  
GULF COUNTY, FLORIDA**

County.....	Gulf	
Approximate Area.....	20 acres	
Date.....	May 24-25, 1950	
Average Depth.....	8 feet	
Bottom.....	Sand and mud	
Length of Seine.....	300 yards	
Minimum Mesh.....	2½ inches	
Species Composition	Pounds	Percentage
Largemouth Bass.....	44	6.9
Black Crappie.....	179	28.2
Bluegill.....	43	6.6
Shellcracker.....	34	5.4
Channel Catfish.....	53	8.4
Speckled Bullhead.....	11	1.7
Chub Sucker.....	272	42.8
Total fish taken.....	636	100
Number of hauls.....	7	
Average pounds per haul.....	91	
Average pounds per acre.....	31.8	
Total rough fish taken.....	336	
Average pounds rough fish per acre.....	16.8	

removal of 336 pounds of rough fish, or 16.8 pounds per acre, will improve sport fishing. A complete record of fish taken may be found in Table 11.

### LAKE ELLA

Lake Ella, a 10.5 acre lake located in the City of Tallahassee, was placed under management at the request of civic organizations and the City of Tallahassee in the spring of 1949. The preliminary analysis indicated that the heavy population of rough fishes was interfering with best production of bass and bream. In April, Lake Ella was first seined and 1,116 pounds of fish were removed, the game fish being released in open waters of Leon County. Following this seining, the remainder of the fish were poisoned and 10,500 fingerling bream were added in May followed by 1,050 fingerling bass in July and the lake was closed to fishing. In June, 1950, an additional 1,050 bass fingerlings were added after an analysis revealed that the population tended toward over-crowding by bream.

On July 7, 1950, Lake Ella was opened to fishing to children under 15 years of age. A contest sponsored by the local organizations was

conducted and more than 500 children participated. Almost every child caught some fish, approximately 200 pounds being taken in all. The catch revealed, however, that the poisoning job had not been 100 percent complete, as warmouth and speckled bullhead were taken, neither of which had been stocked following the poisoning.

### LAKE WIRE

Lake Wire, a 25 acre lake in the City of Lakeland, was placed under management in early 1949 at the request of the City Commission. Lake Wire presented a double problem in that an overpopulation of bream was present and the entire lake was choked by an aquatic weed known as *Elodea*. In cooperation with the City Recreation Department, the first step in the management of Lake Wire was the eradication of the heavy weed growth by an application of sodium arsenite. Decay of the dense growth resulted in the almost complete eradication of the fish population brought about by the depletion of the dissolved oxygen supply. The remainder of the fish were poisoned in June, the lake was restocked with bass and bream, and a program of fertilization was undertaken by local interests. On June 3, 1950, Lake Wire was opened to children under 15 years of age and a contest sponsored by local organizations was conducted. A number of bass were taken, the largest weighing several ounces over two pounds.

### BLUE POND

At the request of Washington County civic organizations, Blue Pond, located near Chipley, was placed under management in early 1950. As attempts to seine Blue Pond were unsuccessful, poison was applied to eliminate the fish population. A total of approximately 955 pounds of fish were removed and examination indicated that growth of game fish was poor, principally due to over-crowding. One-year-old bass averaged only 7 inches in length and weighed 5 ounces. Two-year old bass averaged only 11 inches and weighed only 10 to 12 ounces. Almost 450 bass less than 12½ inches long were recovered, and only 9 over that size were taken. The few crappie taken were also stunted. Blue Pond was restocked in the summer of 1950 and a program of fertilization started. It is planned that fishing will be opened to the public on July 1, 1951.

## LAKE TALQUIN

Lake Talquin is an artificial lake of approximately 11,500 acres formed by the impoundment of the Ochlocknee River in Leon and Gadsden Counties by the Florida Power Corporation in the 1920's. In recent years the lake had become choked with water hyacinths and local fishermen requested assistance in their control. An aerial survey by the Fish Management Division in early 1950 indicated there were approximately 3,000 acres of hyacinths. The Talquin Hyacinth Eradication Association, a group of interested residents of Leon and Gadsden County, was then formed, and a goal of \$10,000 set in a fund drive. This goal was reached in the fall of 1950, and the project started. Initial plots were sprayed by airplane and techniques worked out by Division personnel and the contracting operator of the spraying planes.

These initial experiments determined that effective control could be obtained with an application of 1.5 pounds of the acid equivalent Dichloro-diphenyl-oxyacetic acid in two gallons of No. 2 diesel fuel per acre. The entire area of hyacinths was then sprayed by air at this rate between October 24 and November 16, 1950. Within a few days after the initial application the plants withered, turned brown, and close examination revealed that almost 90 percent of the mature plants were killed. Inspection in late December revealed that the greater part of the floating plants had sunk or were decaying. It is planned that the operations will be repeated in 1951 to control any plants not killed in the initial application, as well as seedlings sprouted since that time.

## Fisheries Surveys and Experimental Projects

Fisheries surveys have been conducted on several of Florida's larger bodies of fresh water and are designed principally to obtain basic information of the fish and fisheries of the waters involved. As mentioned previously, the management of the fisheries to obtain best sport fishing and maximum utilization of those resources depends upon having a volume of adequate information concerning present fish populations, their inter-relationships and the effect of known factors upon their production, as well as detailed data on the life history and specific habits of each species involved. It is also necessary to know what effect interference by man has upon these fish populations, and how best man can manipulate the factors involved in order to result in the desired objectives.

As in the management of a large business, it is necessary to have complete data on inventory and to keep account of the changes in those basic stocks and the amount of the production that is being used for best management. Florida, over the past several years, has been pioneering in this field, and has attracted national attention because of its aggressive attack on the many problems involved in the management of its fresh-water fish. As in the case of modern agriculture and forestry, perpetual inventory must be taken to determine the status of the supplies, and continual research must be conducted to determine how best those supplies can be increased and made available for use by the State. It is known that the production of fish in a given area of water, as the production of agricultural crops from a given area of land, is limited. It is further known that Florida anglers are using only a small percentage of the available fish produced in most of its larger waters, and the research program is designed not only to find methods of increasing the total productivity of our waters, but also of the species which are desired by the angler.

It has been determined by careful research and experimentation that the productivity of fresh waters is more or less stable and can be measured in pounds per surface acre. It is also known that all fish in that given acre of water are dependent upon that same basic food supply and are in severe competition with one another. For instance, crappie (speckled perch) and garfish use the same types of food which are eaten by the black bass, and as a result the presence of the former species in considerable numbers has been found to reduce the capacity of those waters to produce and support bass. Where the black bass is the major fish desired by the angler, as results of surveys have shown, it is necessary to find methods of reducing the competing species in order that black bass production will be enhanced.

The Fish Management Division is attempting to work out the numbers and amounts and rates of removal of competing species which will result in greatest increase and catch of bass, and at the same time make best available use of those species removed to make room for increased bass production. Results of the individual surveys are discussed below by the areas concerned.



## **St. Johns River and Lake Okeechobee Fisheries Surveys**

Detailed studies of the fish and fisheries of the St. Johns River with particular emphasis in the Lake George area and of Lake Okeechobee were initiated in 1948. Much valuable data on the fish of those areas have been gathered and many of the basic statistics concerning the dynamics and inter-relationships of the adult fish populations have been compiled. The studies were undertaken principally to try to solve some of the problems involved in the commercial taking of certain species of fresh-water fish found there, and to determine what methods could be used by the commercial fishermen which would not harm the interests of the recreational fisherman, but might possibly enhance his chances for better catches. Several detailed reports on the findings of this survey have been made and recommendations for management based upon those findings have been submitted to the Commission.

Major among these reports were "Report on Fisheries Investigations for the Year Ending June 30, 1949" and "A Report on Fisheries Investigations of the St. Johns River and Lake Okeechobee, 1948-50, With Recommendations For Management", which combined the results of findings on both bodies of water. The major findings of these surveys are briefly that the abundance of the fish populations fluctuated considerably from season to season and during the year, these fluctuations being attributed to "natural" factors rather than by the direct interference by man. It could not be determined during the two-year intensive study that commercial fishing operations were instrumental in causing any of the changes in the fish populations, although by the same token no harm to recreational fishing in those waters could be attributed to commercial fishing operations. It was further found that the life span of the game fishes in those waters was relatively short and growth rates extremely rapid. Natural mortality rates were found to be high and use of available standing fish supplies by anglers was found to be negligible. No evidence was found that total productivity of the waters of black bass had decreased, although it was determined that the yield of this species was being scattered among a greatly increased army of recreational anglers. It was concluded that the available production of bream and crappie in the Lake George and Lake Okeechobee areas was largely being wasted and lost through natural mortality, representing a huge economic loss to the state.

Table 10  
MONTHLY COMPOSITION OF ADULT FISH POPULATIONS AND  
OTHER DATA AS DETERMINED BY HAUL SEINE SURVEYS  
IN LAKE OKEECHOBEE  
JULY, 1948, THROUGH DECEMBER, 1959

Name of Waters County. Approximate Area. Average Depth Surveyed Bottom Type	Lake Okeechobee, Okeechobee, Glades, Hendry, Palm Beach 703 sq. mi.—480,357 acres 3-12—feet Sand and mud											
	Date of Survey		July, 1948		August, 1948		Sept., 1948		October, 1948		Nov., 1948	
	Length of Seine Minimum Mesh (stretched)	1200-1600 yds. 2½ inches	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age	Pounds Taken	Per- cent- age
Species Composition												
Largemouth Bass	13,215	22.1	15,323	14.5	25,044	13.1	17,178	8.4	16,294	8.1		
Black Crappie	1,084	1.8	2,719	2.6	12,323	6.4	47,750	23.5	52,013	25.8		
Bluegill	14,192	23.7	12,485	11.9	17,286	9.0	13,980	6.9	4,178	2.1		
Shellecracker	16,988	28.4	27,352	26.0	33,149	17.3	15,931	7.8	17,975	8.9		
Redbreast												
Miscellaneous Sunfish												
Chain Pickerel	13		114	0.1	41		13		14			
Channel Catfish	6,304	10.5	17,918	17.0	37,293	19.6	50,070	24.6	55,775	27.7		
White Catfish	4,570	7.6	625	0.6	4,593	2.4	32,037	15.7	9,425	4.7		
Speckled Bullhead	1,559	2.7	9,788	9.3	21,070	11.0	513	0.3	1,216	0.6		
Yellow Bullhead	2											
Longnose Gar			6		47		122	0.1	9			
Other Gar	260	0.4	1,285	1.2	4,031	2.1	6,791	3.3	5,466	2.7		
Mudfish	63	0.1	409	0.4	432	0.2	169	0.1	59			
Gizzard Shad	1,020	1.7	12,992	12.3	12,308	6.4	17,627	8.7	38,419	19.1		
Catfish Snucker	560	0.9	4,325	4.1	23,534	12.3	35					
Golden Shiner			2		10		13		11			
Misc. Fresh Water Species												
American Shad												
Other Clupeids												
Mullet			21		43		420	0.2	72			
Misc. Salt Water Species	47	0.1			342	0.2	983	0.4	399	0.2		
Total fish taken	59,907	100	105,374	100	191,546	100	203,632	100	201,504	100		
Number of hauls	15		33		72		64		89			
Average pounds per haul	3,994		3,193		2,660		3,182		2,264			
Pounds rough fish removed												
Pounds rough fish removed per acre	14,415		47,371		103,703		108,780		111,030			

MONTHLY COMPOSITION OF ADULT FISH POPULATIONS AND  
OTHER DATA AS DETERMINED BY HAUL SEINE SURVEYS IN  
LAKE GEORGE, JULY, 1948, THROUGH DECEMBER, 1950

Name of Waters.	Lake George									
County.	Putnam, Marion, Volusia, Lake									
Approximate Area.	73.5 sq. mi.—47, 065 acres									
Average Depth Surveyed	3-12 feet									
Bottom Type	Sand and mud									
Date of Survey	July, 1948		August, 1948		September, 1948		October, 1948		Nov., 1948	
Length of Seine	1200-1000 yds.									
Minimum Mesh (stretched)	3 inches									
Species Composition	Pounds Taken	Per-cent age	Pounds Taken	Per-cent age	Pounds Taken	Per-cent age	Pounds Taken	Per-cent age	Pounds Taken	Per-cent age
Largemouth Bass	1,688	19.1	3,083	9.2	9,070	4.7	13,233	3.3	7,549	2.7
Black Crappie	324	3.6	1,341	4.0	23,760	13.0	59,237	14.7	49,005	17.3
Bullhead	1,324	13.5	3,928	11.7	14,940	7.5	16,798	4.2	10,883	3.8
Shelleater	1,945	10.7	2,580	7.7	14,954	7.5	12,989	3.2	6,975	2.5
Hedbreast	90	1.0	45	0.1	301	0.2	186	0.1	241	0.1
Miscellaneous Sunfish			2				77		3	
Chain Pickerel	1,918	21.6	8,167	24.4	51,172	25.8	89,733	22.3	61,349	21.6
Channel Catfish	1,199	13.5	6,154	18.3	41,724	21.0	88,857	22.1	74,880	26.4
White Catfish	247	2.8	481	1.4	4,217	2.1	8,585	2.1	8,333	2.9
Speckled Bl. head					1		1			
Yellow Bullhead										
Longnose Gar	257	2.9	343	1.0	797	0.4	315	0.1	135	
Other Gar	6	0.1	19	0.1	23		171		86	
Mudfish										
Gizzard Shad	918	10.4	6,390	19.0	31,404	15.8	71,664	17.8	59,642	21.0
Chub Sucker	19	0.2	5		6		3		8	
Golden Shiner	12	0.1	77	0.2	95	0.1	44		150	0.1
Misc. Fresh Water Species					3		24		8	
American Shad							21		214	0.1
Other Clupeids							36,396	9.0	3,680	1.3
Mullet	14	0.2	12		2,941	1.5	3,929	1.1	451	0.2
Misc. Salt Water Species	28	0.3			74	0.4	236	0.1	144	
Total fish taken	8,860	100	33,627	100	198,278	100	402,457	100	283,708	100
Number of hauls	13		19		60		97		81	
Average pounds per haul	681		1,770		3,304		4,149		3,502	
Pounds taken per acre										
Pounds to 10 ft fish removed					135,234		299,981		209,082	
Pounds rough fish removed per acre	4,618		22,648							

Table 12 (Continued)

Dec., 1948		January, 1949		February, 1949		March, 1949		April, 1949		May, 1949		June, 1949	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
4,012	2.4	5,620	2.5	7,241	5.1	9,186	6.1	7,523	9.6	11,471	10.4	2,819	4.9
38,659	23.2	44,380	20.1	26,207	18.6	27,276	18.1	10,406	13.4	10,409	9.5	5,217	9.1
7,969	4.8	20,045	9.1	20,119	14.2	22,712	15.1	8,146	10.4	11,604	10.6	3,944	6.9
9,568	5.7	13,423	6.1	5,687	4.0	7,935	5.2	7,250	9.3	6,751	6.1	2,525	4.4
101	0.1	98	0.1	305	0.2	353	0.2	77	0.1	91	0.1	443	0.8
3		5		4		6		1				2	
26,206	15.7	32,616	14.8	21,592	15.2	18,256	12.1	12,423	15.9	25,383	23.2	19,939	34.9
34,816	20.9	44,541	20.2	36,047	25.5	30,135	19.9	13,762	17.6	25,889	23.6	8,202	14.4
8,568	5.1	11,241	5.1	9,993	7.0	7,097	4.7	2,486	3.2	1,180	1.1	944	1.7
2		33		80	0.1	229	0.2	331	0.4	229	0.2	148	0.3
16		20		48		38		54	0.1	40		9	
8		21		9		28		4		9		6	
35,277	21.2	39,619	17.9	12,929	9.1	25,901	17.2	14,047	18.1	15,558	14.2	12,032	21.1
3		4		2		3		1		2			
102	0.1	84	0.1	34		55		32		33		23	
5		14		34		46		27		5			
491	0.3	2,316	1.0	904	0.6	659	0.4	687	0.9	28			
10		6,035	2.7	122	0.1	322	0.2	281	0.4	920	0.8	567	1.0
65		10		59		51		52	0.1	153	0.1	89	0.2
816	0.5	644		488	0.3	1,019	0.6	435	0.5	136	0.1	186	0.4
166,697	100	220,776	100	141,913	100	151,309	100	78,025	100	109,891	100	57,095	100
61		74		67		84		66		93		48	
2,732		2,983		2,118		1,801		1,182		1,181		1,189	
106,385		137,205		82,341		83,839		44,622		69,565		42,145	

Table 13 (Continued)

December, 1948		January, 1949		February, 1949		March, 1949		April, 1949		May, 1949		June, 1949	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
14,798	7.8	7,161	5.5	24,735	6.4	29,897	7.3	22,516	7.2	38,877	18.2	17,756	8.1
42,166	22.3	38,372	29.3	96,212	25.0	74,467	18.1	35,098	11.3	10,554	4.9	5,719	2.6
4,958	2.6	2,793	2.1	20,903	5.4	51,574	12.6	59,696	19.2	44,674	20.9	48,502	22.1
16,416	8.7	6,712	5.1	29,191	7.6	28,690	7.0	38,446	12.5	18,460	8.7	26,585	12.1
1				2		14		14		1		1	
2		5		26		91		170	0.1	165	0.1	66	
31,115	16.4	25,043	19.1	53,960	14.0	53,463	13.0	21,193	6.8	13,788	6.5	31,205	14.3
16,581	8.8	20,106	15.4	26,381	6.9	43,125	10.5	17,278	5.6	5,958	2.8	6,814	3.1
1,325	0.7	258	0.2	9,389	2.5	23,900	5.8	39,519	12.7	37,159	18.3	34,281	15.7
		1				22							
50		112	0.1	23		441	0.1	70				120	0.1
5,479	2.9	4,078	3.1	12,817	3.3	17,488	4.3	11,595	3.7	5,127	2.4	4,247	1.9
55		129	0.1	2,042	0.5	10,794	2.7	7,761	2.5	8,914	4.2	4,595	2.1
55,706	29.4	25,925	19.8	108,346	28.1	69,732	17.2	42,552	13.7	11,816	5.5	16,629	7.6
608	0.3	2		903	0.2	5,923	1.4	14,351	4.6	15,175	7.1	22,592	10.3
8		13		124	0.1	11							
								6					
37	0.1	3		14		41		22		41		6	
65		218	0.2	29		63		217	0.1	793	0.4	18	
189,370	100	130,931	100	385,097	100	409,736	100	310,804	100	213,502	100	219,136	100
69		43		98		105		78		53		48	
2,744		3,045		3,930		3,902		3,985		4,028		4,565	
111,029		75,888		214,028		225,003		154,564		100,771		120,507	

Table 12 (Continued)

TOTAL		July, 1949		August, 1949		Sept., 1949		October, 1949		Nov., 1949		December, 1949	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
82,495	4.5	8,049	2.2	8,715	2.6	18,428	6.0	17,820	7.4	9,143	3.0	12,158	6.3
298,221	16.1	23,397	6.3	52,378	15.8	54,518	17.7	57,316	23.9	120,569	40.3	68,900	35.4
142,253	7.7	26,640	7.1	44,151	13.3	52,090	16.9	26,565	11.1	26,592	8.9	19,017	9.8
91,532	4.9	23,923	6.4	23,056	6.9	18,581	6.0	13,912	5.8	18,338	6.1	12,446	6.5
2,331	0.1	104		164	0.1	764	0.2	1,048	0.4	245	0.1	137	0.1
114				1		1				3		3	
25													
368,754	19.9	91,994	24.8	75,832	22.9	62,328	20.3	35,965	15.3	41,823	14.0	30,164	15.5
406,216	21.9	112,177	30.2	57,913	17.4	39,501	12.8	12,505	5.2	33,205	11.1	29,638	15.2
63,372	3.4	7,923	2.1	5,118	1.5	1,830	0.6	1,600	0.7	2,045	0.7	3,011	1.5
9		4								2		1	
2,899	0.2	166		761	0.2	2,089	0.7	340	0.1	559	0.2	86	0.1
530		10		86		101		266	0.1	71		9	
88								9		25		45	
325,381	17.7	52,824	14.2	50,030	15.1	52,773	17.2	52,751	22.0	40,290	13.4	14,973	7.7
48		8				8				6		1	
741		68		67		136		149	0.1	176	0.1	46	
166		11		3		3		19		14		38	
5,320	0.3							6		446	0.1	719	0.4
52,273	2.8	24,028	6.5	13,310	4.1	3,501	1.1	15,736	6.5	5,376	1.8	2,687	1.4
5,662	0.3	385	0.1	164	0.1	805	0.3	675	0.3	361	0.1	60	
4,206	0.2	504	0.1	330	0.1	419	0.1	2,669	1.1	495	0.1	408	0.1
1,852,636		372,215	100	332,079	100	307,876	100	239,351	100	299,784	100	194,547	100
763		189		124		145		148		119		88	
2,428		4,182		2,678		2,123		1,617		2,519		2,210	
39.4													
1,235,665		290,102		203,614		163,494		122,690		124,894		81,886	
2.63													

Table 13 (Continued)

TOTAL		July, 1949		August, 1949		Sept., 1949		October, 1949		Nov., 1949		Dec., 1949	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
242,794	9.3	10,660	5.8	16,201	11.8	10,462	8.4	9,138	5.5	6,782	3.8	3,541	3.0
418,477	15.9	10,674	5.9	11,963	8.7	20,485	16.4	44,715	26.8	61,227	34.6	38,414	32.3
295,231	11.3	21,821	12.0	9,982	7.3	3,548	2.8	2,775	1.7	8,977	5.1	2,053	1.7
276,195	10.5	12,819	7.1	10,220	7.5	5,174	4.2	6,225	3.7	6,121	3.5	1,484	1.2
33													
720				5									
397,127	15.2	35,678	19.6	26,855	19.6	43,560	35.0	56,468	33.8	45,616	25.8	27,873	23.5
187,493	7.2	6,731	3.7			7,357	5.9	11,684	7.0	9,793	5.5	13,973	11.8
182,037	6.9	69,016	38.0	45,182	32.9	7,687	6.2	571	0.3	2,050	1.2	584	0.5
174													
1,000		29		50		70	0.1	16		20			
78,694	3.0	3,029	1.7	3,930	2.9	5,856	4.7	7,553	4.5	8,633	4.9	7,578	6.4
35,422	1.4	1,763	1.0	2,384	1.7	664	0.5	340	0.2	359	0.2	425	0.4
413,072	15.8	4,087	2.3	6,062	4.4	19,356	15.5	27,490	16.5	27,361	15.4	22,738	19.1
88,008	3.4	5,394	2.9	4,396	3.2	284	0.2	62					
192				6									
6													
720				13		3		7		21		3	
3,174	0.1	24		32		194	0.1	7		58		78	0.1
2620,539	100	181,725	100	137,221	100	124,700	100	167,051	100	177,018	100	118,744	100
767		55		92		75		95		60		45	
3,416		3,304		1,491		1,663		1,758		2,950		2,639	
5.8													
1,387,089		125,751		88,910		85,031		104,198		93,911		73,252	



Table 12 (Continued)

Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage
13,020	6.9	8,293	12.3	10,106	12.4	6,261	14.0	18,034	14.2	6,321	8.4	136,348	5.8
55,643	29.7	11,641	17.4	16,316	19.3	8,232	18.5	12,394	9.7	5,732	7.6	487,036	20.9
25,885	13.8	11,737	17.5	16,162	19.3	14,551	32.6	21,554	17.0	5,942	7.9	290,886	12.5
14,512	7.7	4,369	6.5	5,286	6.3	2,918	6.5	4,964	3.9	2,481	3.3	144,786	6.2
161	0.1	106	0.1	235	0.3	68	0.2	166	0.1	217	0.3	3,415	0.1
3		1		3								15	
18,096	9.7	8,551	12.7	11,725	14.0	3,307	7.4	12,997	10.2	7,658	10.1	400,440	17.2
14,297	7.6	7,477	11.1	7,739	9.2	3,630	8.1	23,036	18.2	9,928	13.1	351,046	15.1
3,506	1.9	1,621	2.4	1,318	1.6	287	0.6	845	0.7	602	0.9	29,706	1.3
1								5				13	
113	0.1	19		120	0.1	63	0.1	586	0.5	285	0.4	5,187	0.2
77		28		35		30	0.1	40		38		791	
18		7		6		5		14		5		134	
36,713	19.6	9,695	14.4	9,585	11.4	4,399	9.8	31,839	25.1	35,840	47.4	391,712	16.7
2		1		2		33	0.1					61	
71		283	0.4	63	0.1	30	0.1	15		42		1,146	0.1
41		6		37		4						176	
1,227	0.9	243	0.4	604	0.7	287	0.6	29				3,961	0.2
1,492	0.8	448	0.7	504	0.6	11				3		67,036	2.9
75		108	0.2	33		58	0.1	258	0.2	149	0.2	3,131	0.1
2,544	1.2	2,629	3.9	4,017	4.7	561	1.2	381	0.2	320	0.4	15,277	0.7
187,897	100	67,267	100	83,898	100	44,738	100	127,157	100	75,563	100	2,332,372	
110		46		48		31		84		77		1,109	
1,708		1,462		1,747		1,443		1,513		1,007		2,103	
												49.6	
78,673		31,116		35,788		12,705		70,045		54,870		1,269,877	
												26.9	

Table 13 (Continued)

January, 1950		February, 1950		March, 1950		April, 1950		May, 1950		June, 1950		TOTAL	
Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage	Pounds Taken	Percentage
6,292	5.1	4,651	6.1	7,393	8.8	6,934	10.6	2,556	8.6	3,290	6.5	87,900	6.5
30,948	24.9	17,680	23.4	16,583	19.8	9,244	14.1	2,312	7.9	5,506	10.9	269,691	20.2
1,104	0.9	1,673	2.2	3,675	4.4	4,812	7.4	3,237	11.1	4,979	9.8	68,636	5.1
1,559	1.3	972	1.3	1,781	2.1	1,747	2.7	1,193	4.1	3,820	7.5	53,115	4.0
				4		2		15	0.1	6		32	
35,446	28.5	24,094	31.7	18,450	22.0	1,404	2.1	345	1.2	88	0.2	315,877	23.6
8,477	6.8	4,227	5.6	3,345	4.0	1,325	2.0	4,151	14.2	1,532	3.0	72,595	5.4
9,240	7.4	9,375	12.3	15,383	18.5	25,234	38.5	11,761	40.3	23,412	46.3	219,495	16.5
12		11		95	0.1	52	0.1			3		358	0.1
6,627	5.3	3,937	5.2	4,858	5.8	5,123	7.8	1,266	4.4	651	1.3	59,041	4.4
1,061	0.9	1,779	2.3	2,261	2.7	2,013	3.1	998	3.4	2,512	5.0	16,559	1.2
23,435	18.9	7,493	9.9	9,496	11.3	6,887	10.5	996	3.4	3,765	7.4	159,166	11.9
		5		457	0.5	571	0.9	355	1.2	1,072	2.1	12,596	0.9
		35		1		66	0.1			4		112	0.1
				1		2						3	
12		3		3		2						67	
11		33				103	0.1	23	0.1			563	0.1
124,224	100	75,968	100	83,786	100	65,521	100	29,208	100	50,640	100	1,335,866	100
62		55		70		52		25		33		719	
2,004		1,381		1,197		1,260		1,168		1,535		1,857	
												3.0	
84,321		50,992		54,350		42,782		19,895		33,039		856,432	
												1.9	



Table 12 (Continued)

July, 1950		August, 1950		Sept., 1950		October, 1950		Nov., 1950		Dec., 1950		TOTAL	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
3,101	2.6	10,300	3.5	1,437	2.7	1,579	2.7	3,592	6.6	1,230	5.3	21,239	3.5
3,158	2.6	11,824	4.0	3,359	6.4	7,584	12.8	7,300	13.3	6,088	26.3	39,313	6.5
5,946	4.9	28,266	9.6	3,310	6.3	3,828	6.5	10,707	19.6	4,327	18.8	56,384	9.4
3,797	3.2	10,896	3.7	3,405	6.4	1,967	3.3	1,972	3.6	1,056	4.6	23,033	3.8
33		33		30		10		54	0.1	4		164	
14										1		15	
34,178	28.4	108,938	37.1	13,050	24.7	6,219	10.5	6,749	12.3	2,042	8.8	171,176	28.5
26,404	22.1	61,063	20.8	15,861	30.0	25,584	43.4	1,809	3.3	1,629	7.0	132,350	21.9
8,332	6.9	9,075	3.1	136	0.3	172	0.3	307	0.6	155	0.7	18,177	3.0
6		6										12	
168	0.1	160	0.1	132	0.3	108	0.2	57	0.1	6		631	0.1
201	0.2	17		8		4		5				235	
								9				9	
33,549	27.9	52,153	17.8	11,937	22.6	11,555	19.6	21,230	38.8	6,138	26.5	136,562	22.6
2		2		4				2				10	
106	0.1	97		4		2		18		14	0.1	241	
		14										14	
3		57		15		6		466	0.9	271	1.2	818	0.1
987	0.8	189	0.1	31		117	0.2	276	0.5	47	0.2	1,647	0.3
266	0.2	396	0.2	153	0.3	293	0.5	137	0.3	137	0.5	1,382	0.3
120,251	100	293,486	100	52,872	100	59,028	100	54,690	100	23,145	100	603,482	100
36		100		50		32		29		10		257	
3,340		2,935		1,057		1,845		1,886		2,314		2,348	
104,202		232,167		41,331		44,060		31,065		10,439		12,8	
												9.8	

Table 13 (Continued)

July, 1950		August, 1950		Sept., 1950		October, 1950		Nov., 1950		December, 1950		TOTAL	
Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age	Pounds Taken	Per-cent-age
3,377	8.5	9,190	12.5	4,772	14.4	8,972	19.7	3,219	12.7	1,369	10.1	30,899	13.4
2,442	6.2	2,404	3.3	1,103	3.3	1,427	3.1	7,691	30.4	3,406	25.2	18,473	8.0
1,895	4.8	14,054	19.1	2,290	7.0	7,266	15.9	2,183	9.4	302	2.2	28,190	12.2
1,949	4.9	11,624	15.8	2,757	8.3	8,371	18.4	1,183	4.7	46	0.3	25,930	11.2
				3								3	
4		9										13	
40		2,266	3.1	3,276	9.9	5,186	11.4	2,249	9.0	1,350	10.0	14,367	6.2
13		732	1.0	4,004	12.1	5,389	11.8	4,282	16.9	2,092	15.5	16,512	7.2
21,246	53.7	23,964	32.5	10,940	33.1	3,422	7.6	575	2.3	1,687	12.5	61,834	26.8
						15		62				77	
610	1.5	718	1.0	465	1.4	1,166	2.6	1,747	6.9	538	4.0	5,244	2.3
1,352	3.4	1,179	1.6	867	2.6	706	1.5	274	1.1	384	2.8	4,762	2.1
5,601	14.6	1,833	2.5	741	2.2	2,339	5.1	1,205	4.8	2,345	17.4	14,064	6.1
951	2.4	5,227	7.1	1,790	5.4	1,067	2.3	123	0.5	1		9,159	4.0
21		96	0.1	3		39	0.1	197	0.7	2		358	0.1
68		342	0.4	99	0.3	230	0.5	178	0.6	4		921	0.4
39,569	100	73,638	100	33,110	100	45,595	100	25,368	100	13,526	100	230,846	100
35		53		31		44		17		12		192	
1,131		1,389		1,068		1,036		1,492		1,127		1,202	
29,902		36,357		22,185		19,559		10,892		8,403		.5	
												.3	

Regulations were suggested for the taking of this huge crop by private industry under a system of controlled fishing by haul seines, pound nets, hoop nets and wire traps in order to allow utilization of this huge, now wasted resource. The need for continual inventory and check on the fish populations was also emphasized in order to safeguard the fish population from depletion or over-utilization. Statistics on the monthly trends in composition of adult fish populations as determined by haul seines in the Lake George and Lake Okeechobee areas may be found in Tables 12 and 13. It should be pointed out that while the data listed in the first 12 months of survey reflect total catch by haul seine, the remaining data represent only a sample, varying from approximately 30 to 80 percent of the total catch, as a reduction in supervising manpower during the periods covered by the latter tables prevented checking every haul made. Data obtained from Crescent Lake, covered by the Lake George survey may be found in Table 14.

Incidental to other duties, it has been possible to obtain some data on the catch by sport fishermen on several important fishing waters. These data, referred to as "Creel Census" records are used primarily to determine the quality of fishing afforded by the waters in question, and to indicate whether fishing is improving over a period of years. It has not been possible to devote as much time as desired to this important phase of the measurement of fishing success, but those results which have been obtained are presented.

In addition to the numbers and weights of fish caught, information is usually gathered on the number of hours of fishing, the percentage of effort expended on each species, and in some cases a count of the total fishermen in the area.

Some data are available by months back to early 1948 in the Lake George area, and to 1949 in Lake Okeechobee, and are reported in Tables 15, 16, and 17. Opening day records have been obtained for several of the west Florida waters which have retained the two months closed season, and are reported in Table 18.

### **Fishing Gear Catch Studies**

In order to determine the effect of certain commercial fishing devices upon fish populations and to obtain information on the best type of gear which could be used to harvest catfish and other species, a number of studies of individual types of fishing devices

in various waters have been conducted. Results of some of these studies were reported in the Biennial Report for 1947-48, but many more have been carried out since then and are reported here.

Gear catch studies are conducted by Commission personnel in cooperation with local commercial fishermen. These local fishermen are instructed in keeping daily records of their catches and are visited at intervals during the experimental period. Fishermen chosen for this type of work are those having a reputation of integrity and trustworthiness, plus the willingness and ability to keep accurate records. The large majority of them have shown considerable interest in keeping accurate records and in the outcome of the studies. However, the data from a few fishermen who failed to live up to expectations were disregarded and not used in compiling information in these studies. Types of bait used, exact location of devices, depth of water, and other important information is kept, along with the catch.

### **WIRE TRAPS**

Wire traps for taking catfish are used in a number of the larger fresh waters of Florida under special permit from the Commission. Legal traps are of cylindrical construction of ordinary chicken wire with a mesh of either 1" or 1¼". One or two funnels may be located in one end of the trap only, and the length may not exceed 7 feet or the diameter 32 inches. Traps must be baited continuously and visited not less than once each 48 hours, and all must be marked by stakes or floats with a tag denoting ownership attached to each trap. Traps are not permitted in waters less than 4 feet in depth. In general, catch of these baited wire traps is less than 7 percent by weight of game fish and very little mortality is incurred in releasing these fish. In view of this low catch of game fish, it is thought that the operation of baited wire traps has no detrimental effect on game fish populations and is probably of some assistance in helping to remove a large volume of rough fish and making possible the utilization of these rough fish, which would otherwise not be taken. Studies have been carried out in Lakes Istokpoga, Okeechobee, Hatchineha, Lake Wilmington, and others, four of which are reported in Table 19.

### **POUND NETS**

The limited use of pound nets has been permitted in the Lake George area of the St. Johns River, Lake Okeechobee, Lake Istokpoga, and Doctor's Lake. Pound nets of the type approved for use

Table 14.

**COMPOSITION OF ADULT FISH POPULATION AND OTHER DATA AS  
DETERMINED BY HAND SEINE SURVEY IN CRESCENT LAKE**

Name of Waters.....	Lake Crescent	
County.....	Putnam	
Approximate Area.....	16,742 acres	
Average Depth Surveyed.....	6-10 feet	
Bottom Type.....	Sand	
Date of Survey.....	April 1950	
Length of Seine.....	1500 yards	
Minimum Mesh (stretched).....	3 inches	
Species Composition	Pounds Taken	Percent- age
Largemouth Bass.....	1,408	12.7
Black Crappie.....	608	5.5
Bluegill.....	2,588	23.4
Shellcracker.....	449	4.1
Redbreast.....	26	0.2
Miscellaneous Sunfish.....		
Chain Pickerel.....		
Channel Catfish.....	1,734	15.7
White Catfish.....	1,585	14.3
Speckled Bullhead.....	348	3.2
Yellow Bullhead.....		
Longnose Gar.....	664	6.0
Other Gar.....	197	1.8
Gizzard Shad.....	20	0.2
Chub Sucker.....	1,050	9.5
Golden Shiner.....		
Mullet.....	23	0.1
Miscellaneous Salt Water Species.....	361	3.3
Total Fish Taken.....	11,061	100
Number of hauls.....	12	
Average pounds per haul.....	922	
Pounds taken per acre.....	i	
Pounds rough fish removed.....	5,982	
Pounds rough fish removed per acre.....	i	

i-Insignificant figure.

consist of a square box or impoundment constructed of mesh webbing and attached to poles or pilings driven into the bottom. The entrance to this impounded section is a "V" shaped or funnel arrangement of webbing, also stretched on poles, known as the heart. A pound net may be used with or without a wing or lead, which is a straight piece of webbing strung on stationery piling. The fish, during their normal movement, are either intercepted by the wing and led into the heart whence they find their way into the pound, or are attracted through the funnel shaped opening by bait. They are held in the pound until the operator releases the

Table 15.

MONTHLY SUMMARIES OF CREEL CENSUS DATA FROM ST. JOHNS RIVER (LAKE GEORGE AREA) <sup>1</sup> 1948-1950

Month	Number of Persons Checked	Total Hours of Fishing	BLACK BASS			BLACK CRAPPIE			BREAM			OTHERS <sup>2</sup>		
			Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended
February, 1948	123	964.5	62	.07	91.1	10	1.0	1.0	102	1.34	7.9	13	.01	Ine.
March, 1948	80	538.0 <sup>3</sup>	36	.09	75.9				417	3.20	24.1	15	.03	Ine.
April, 1948	246	1,603.5	400	.31	78.9				536	1.59	21.1	8	i	Ine.
May, 1948	21	67.0	41	.67	100.0									
December, 1948	4	5.7	6	1.04	100.0									
February, 1949	44	236.1	5	.02	95.3						4.6	9	.05	Ine.
March, 1949	24	66.5	3	.01	57.9				61	2.17	42.1	5	.01	Ine.
April, 1949	12	34.0	1	.03	100.0									
January, 1950	9	66.0	14	.66	100.0									
February, 1950	92	584.2	81	.15	93.3				17	.38	6.7	9	i	Ine.
March, 1950	74	394.0	62	.16	95.7				2	.40	4.8	6	.01	Ine.
April, 1950	104	665.0	102	.17	91.8				151	2.79	8.2	21	.03	Ine.
May, 1950	101	705.0	76	.11	92.4				36	.68	7.6	11	.01	Ine.
June, 1950	70	266.0	35	.13	96.7				3	.33	3.3	2	.01	Ine.
July, 1950	42	255.0	32	.13	95.3				28	2.33	4.7			
September, 1950 <sup>4</sup>	12	49.0	11	.22	100.0									
November, 1950	188	871.0	133	.16	95.4	4	.24	1.9	50	2.17	2.7	14	.01	Ine.
December, 1950	166	1,069.0	173	.17	96.4				37	.97	3.6	34	.03	Ine.

<sup>1</sup> Compiled by Barry O. Freeman, Fish Management Supervisor.<sup>2</sup> Includes catfish, pickerel, and an occasional gar or mudfish.<sup>3</sup> Hours of fishing not available on 20 people who did not catch anything. Average hours for others used for total.<sup>4</sup> One day only.

i Insignificant.

Ine Incidental.



Table 16.

MONTHLY SUMMARIES OF CREEL CENSUS DATA FROM LAKE OKEECHOBEE<sup>1</sup> 1949-1950

Month	Number of Persons Checked	Total Hours of Fishing	BLACK BASS			BLACK CRAPPIE			BREAM			OTHERS <sup>2</sup>		
			Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended
August, 1949	21	94.0	59	0.80	78.7				57	2.8	21.3			
October, 1949	14	40.5	21	0.51	100.0									
November, 1949	21	69.5	28	0.40	100.0									
December, 1949	25	96.7	57	0.71	82.9	9	.91	9.8	4	.89	4.6	2	.80	2.7
January, 1950	29	132.2	120	0.91	100.0									
February, 1950	16	59.0	15	0.25	100.0									
March, 1950	4	14.5	6	0.41	100.0									
May, 1950	12	43.5	15	0.43	79.3				8	.90	20.7			
September, 1950	9	17.5	15	0.85	100.0									
October, 1950	53	202.0	71	0.28	93.3				22	2.1	5.2	10	3.3	1.5

<sup>1</sup> Compiled by Don R. Luethy, Fish Management Supervisor.<sup>2</sup> Includes catfish, pickerel, and an occasional gar or mudfish.

Table 17.

MONTHLY SUMMARIES OF CREEL CENSUS DATA FROM KISSIMMEE RIVER (OKEECHOBEE AREA)<sup>1</sup>, 1949-50

Month	Number of Persons Checked	Total Hours of Fishing	BLACK BASS			BLACK CRAPPIE			BREAM			OTHERS <sup>2</sup>		
			Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended	Number Taken	Number per Hour	Percent of Effort Expended
December, 1949	53	199.0	8	0.46	6.5	271	1.63	89.5	7	1.7	2.0	4	1.60	2.0
January, 1950	90	361.0	4	0.40	2.8	342	1.10	94.4	14	1.47	2.0	11	3.14	.8
February, 1950	104	371.5	15	0.39	10.5	280	.86	87.8	7	1.00	1.6	1	2.01	.1
March, 1950	108	315.0	3	0.66	.6	252	1.04	84.3	39	1.18	9.9	16	.94	5.2
April, 1950	124	397.2	8	0.45	4.4	527	1.55	85.5	29	1.12	6.5	12	.83	3.6

<sup>1</sup> Compiled by Don R. Luethy, Fish Management Supervisor.<sup>2</sup> Includes catfish, pickerel, and an occasional gar or mudfish.

**Table 18.**  
**OPENING DAY CREEL CENSUS DATA FROM THREE WEST FLORIDA WATERS 1948-1950**

Location	Date	Fishermen Checked	Total Number Fishermen	Total Number Fish Caught	Total Pounds Fish Caught	Average Number Fish per Person	Average Pounds Fish per Person
Ochessee Pond . . . . .	June 1, 1949 . . . . .	43	840	10,993	4,786	13.09	5.70
	June 1, 1950 . . . . .	131	851	4,633	1,276	5.44	1.49
Blue Springs . . . . . (Jackson County)	June 1, 1949 . . . . .	103	400	3,850	1,839	9.64	3.47
	June 1, 1950 . . . . .	66	451	4,736	1,173	10.50	2.60
Dead Lakes . . . . .	June 1, 1948 . . . . .	44	1500	14,535	5,445	9.69	3.63
	June 1, 1949 . . . . .	170	1962	21,190	9,028	10.80	4.60
	June 1, 1950 . . . . .	86	1880	17,296	7,332	9.30	3.90

bottom corners of the net and concentrates them into one corner where he removes them by dip-net. Catfish and other rough fish are placed in the operator's boat, while game fish are thrown back into the waters unharmed. Catches of game fish by pound net are also low, and as all can be returned immediately unharmed, the pound net is not considered detrimental to game fish populations. A complete listing of catches and other data surrounding pound net operations in Lake Istokpoga and the St. Johns River may be found in Table 20.

### **HOOP NETS**

Some studies have also been made of the use of hoop nets in certain areas of the St. Johns River. A hoop net is a cylindrical trapping device made of mesh webbing stretched over large hoops, usually of wooden construction, with one or more mesh throats in the mouth or down-stream end. The maximum diameter permitted is 6 feet with minimum mesh allowed, 3 inches stretched. As in the case of traps, all hoop nets must have the owner's name upon them. Data gathered from hoop net catches in the St. Johns River is presented in Table 21.

### **SHAD AND HERRING SEINES**

Short haul seines are fished seasonally in certain parts of the St. Johns River and Crescent Lake for the purpose of catching the migrating American shad and herring, or alewives. These nets are fished exclusively for shad and herring, although they do incidentally catch a few catfish and other fresh-water species. The maximum length permitted is 600 yards with a minimum mesh of 2 inches stretched. These devices are traditionally fished on specific locations or haul grounds which have been prepared by clearing or filling in with shell by the operator holding the permit, and in general, very few game fish are taken in the areas where most of the fishing by this gear is done. However, it will be noted in Table 22 that studies made on shad and herring seines in certain portions of Lake George took a high percentage of game fish. For this reason, all permits for this gear were discontinued following these studies in Lake George and are now concentrated in the St. Johns River north of Lake George and in certain locations in Crescent Lake. Complete data on catches by this gear may be found in Table 22.

### **GILL AND TRAMMEL NETS**

Both gill and trammel nets are permitted in certain areas of the St. Johns River for the primary purpose of taking mullet. Gill and

Table 19.

**COMPOSITION OF CATCH BY EXPERIMENTAL WIRE TRAPS  
IN SEVERAL FLORIDA WATERS**

Name of Waters.....	Lake Okeechobee		Lake Wilmington		Lake Hatchineha		Lake Istokpoga	
County.....			Indian River		Osceola		Highlands	
Date of Survey.....	December, 1948- May, 1949		January- June, 1950		February 14- March 2, 1949		March, 1949- July, 1950	
	Pounds	Per- centage	Pounds	Per- centage	Pounds	Per- centage	Pounds	Per- centage
Largemouth Bass.....			2		8	2.3	126	0.1
Black Crappie.....			2		4	1.1	123	0.1
Bluegill.....	2		5,622	8.5	12	3.4	7,022	4.0
Shellcracker.....			2		1	0.3	247	0.1
Redbreast.....							150	0.1
Miscellaneous Sunfish.....							16	
Channel Catfish.....	2,722	66.1	22,538	34.2	202	57.2	147,088	81.5
White Catfish.....	1,393	33.8	31,243	47.5	114	32.3	23,324	12.9
Speckled Bullhead.....			4,772	7.3			58	
Yellow Bullhead.....			88	0.1	2	0.6	16	
Longnose Gar.....			185	0.3			763	0.4
Other Gar.....			110	0.2			84	
Mudfish.....			298	0.5			45	
Gizzard Shad.....			881	1.3	10	2.8	1,143	0.6
Chub Sucker.....			52	0.1			29	
Golden Shiner.....			17				271	0.2
Total fish taken.....	4,117	100	65,812	100	353	100	180,505	100
Number trap days.....	1,279		3,295		230		29,473	
Average pounds per trap day.....	3.2		20		1.6		6.1	
Pounds rough fish.....	4,115		60,184		328		172,821	

trammel nets are long, fine-threaded nets, having floats and leads similar to those of a seine, but which depend upon entangling or "gilling" rather than surrounding the fish. Maximum allowable lengths are 300 yards for gill nets, 200 yards for trammel nets, and minimum mesh is 3 inches stretched. The gill net is one of the most selective types of fishing net, and can be used only in specific areas and with such mesh sizes that minimize the take of other than commercial species. For instance, catches by gill nets in the St. Johns River near Green Cove Springs showed a catch of less than 4 percent by weight of game fish, whereas similar netting operations in Lake Apopka yielded as high as 20 percent of game fish. The status of the fish population and catch of game fish determines to a great extent whether or not this type of gear may be permitted in a specific area. Data obtained from gill and trammel net catches may be found in Table 23.

Table 20.

**COMPOSITION OF CATCH BY EXPERIMENTAL POUND NETS  
IN TWO FLORIDA WATERS**

Name of Waters..... County..... Date of Survey.....	Lake Istokpoga Highlands July-December, 1948		St. Johns River Putnam April-June, 1949	
	Pounds	Per- centage	Pounds	Per- centage
Largemouth Bass.....			47	1.0
Black Crappie.....	18		360	7.9
Bluegill.....	23	0.1	45	1.0
Shellcracker.....	1		8	0.2
Redbreast.....	6		2	
Miscellaneous Sunfish.....	27	0.1	1	
Channel Catfish.....	27,906	78.6	1,926	42.3
White Catfish.....	7,428	20.9	1,516	33.2
Speckled Bullhead.....			229	5.0
Yellow Bullhead.....			1	
Longnose Gar.....	21	0.1	83	1.8
Other Gar.....	81	0.2	4	0.1
Mudfish.....	5		4	0.1
Gizzard Shad.....			139	3.0
Chub Sucker.....			3	0.1
Golden Shiner.....			1	
American Shad.....			4	0.1
Mullet.....			148	3.2
Miscellaneous Salt Water Species.....			43	1.0
Total Fish Taken.....	35,516	100	4,564	100
Number of Net Days.....	101		90	
Average pounds per net day.....	351		51	
Pounds of rough fish taken.....	35,441	99.8	4,101	89.9

Table 21.

**COMPOSITION OF CATCH BY EXPERIMENTAL HOOP NETS IN THE  
ST. JOHNS RIVER DURING AUGUST-OCTOBER, 1948**

	Pounds	Percentage
Largemouth Bass.....	87	0.4
Black Crappie.....	262	1.1
Bluegill.....	4	
Redbreast.....	33	0.1
Miscellaneous Sunfish.....	12	0.1
Channel Catfish.....	8,602	35.4
White Catfish.....	12,703	52.3
Speckled Bullhead.....	2,584	10.6
Total fish taken.....	24,287	100
Number of net days.....	3,422	
Average pounds per net day.....	7	
Pounds rough fish taken.....	23,889	98.3



**Table 22.**  
**COMPOSITION OF CATCH BY EXPERIMENTAL SHAD AND HERRING**  
**SEINES IN LAKE GEORGE AND ST. JOHNS RIVER**  
**DURING FEBRUARY, 1949**

Name of Waters..... County.....	Lake George Lake and Volusia		St. Johns River Putnam	
	Pounds	Per- centage	Pounds	Per- centage
Largemouth Bass.....	1,172	39.6	15	0.4
Black Crappie.....	165	5.6	20	0.5
Bluegill.....	855	28.8	8	0.2
Shellcracker.....	75	2.5		
Redbreast.....	20	0.7	5	0.1
Miscellaneous Sunfish.....			2	
Chain Pickerel.....	6	0.2		
Channel Catfish.....	529	17.8	74	2.0
White Catfish.....	8	0.3	14	0.4
Speckled Bullhead.....	99	3.3	1	
Longnose Gar.....			40	1.1
Other Gar.....	9	0.3	3	0.1
Gizzard Shad.....	1		47	1.3
Chub Sucker.....			1	
Golden Shiner.....	6	0.2		
Hickory Shad.....			8	0.2
American Shad.....			1,289	34.5
Herring (Alewives).....			2,205	58.9
Mullet.....			3	0.1
Miscellaneous Salt Water Species.....	22	0.7	6	0.2
Total fish taken.....	2,967		3,741	
Number of hauls.....	4		18	
Average pounds per haul.....	741		208	
Total pounds rough fish taken.....	674	23.6	3,691	98.8

### HAUL SEINES

Haul seines are at present permitted in certain parts of the St. Johns River and in Lake Okeechobee for the purpose of taking catfish and other rough fish. The haul seine is a long piece of mesh webbing having floats at the top and leads on the bottom, enabling it to stand perpendicular in the water. It is usually laid out of a boat and towed in a circle to encircle the fish of a given area. Upon bringing the circle of the net into a continuously smaller area, the fish are finally concentrated into a pocket or bag, from which they are removed. Under present restrictions, all game fish are released immediately upon being taken, while catfish, gars, gizzard shad, suckers, and other rough fish are retained by the fishermen. Mortality of game fish taken in haul seines is generally small, and it is felt that the benefit derived from the removal of the catfish and rough fish more than offsets any small loss in game fish taken by this

**Table 23.**  
**COMPOSITION OF CATCH BY EXPERIMENTAL GILL AND TRAMMEL**  
**NETS IN SEVERAL FLORIDA WATERS**

Name of Waters.....	St. Johns River				Lake Apopka (Orange County)			
Location.....	Clay County				Near E.L. Apopka		Near Oakland	
Dates.....	May and June, 1949				December, 1949- January, 1950		January 16-31, 1950	
Type of Gear.....	Gill Net		Trammel Net		Gill Net		Gill Net	
Length of Net.....	250 yards		250 yards		200 yards		200 yards	
Minimum Mesh (stretched).....	2½ inches		3 inches		5 inches		5 inches	
Species Composition	Pounds	Per- centage	Pounds	Per- centage	Pounds	Per- centage	Pounds	Per- centage
Largemouth Bass.....	8	0.3	24	1.4	1,234	16.9	45	1.1
Black Crappie.....	11	0.4	11	0.7	172	2.3	22	0.5
Bluegill.....	103	3.9	35	2.1	31	0.4	3	
Chain Pickerel.....	1							
Miscellaneous Sunfish.....	1		1					
Mullet.....	1,491	56.2	736	43.9				
Channel Catfish.....	688	26.0	647	38.6				
Longnose Gar.....	103	3.9	14	0.8	61	0.8	1,152	27.2
Other Gar.....	25	0.9	4	0.2				
Mudfish.....	1				1,852	25.3	206	4.9
Gizzard Shad.....	85	3.2	152	9.1	3,753	51.3	2,765	65.4
Chub Sucker.....	14	0.5	9	0.5				
Golden Shiner.....	4	0.2	19	1.1				
Miscellaneous Fresh Water Species.....					204	2.8	37	0.9
Miscellaneous Salt Water Species.....	116	4.5	27	1.6				
Total fish taken.....	2,651	100	1,679	100	7,307	100	4,230	100
Total runs made.....	60		24		24		6	
Average pounds per run.....	44		70		304		705	
Total pounds rough fish.....	2,527		1,608		5,870		4,160	

**Table 24.**  
**COMPOSITION OF CATCH BY EXPERIMENTAL SIAT BASKETS IN THE**  
**SUWANNEE RIVER, IN DIXIE COUNTY, APRIL-JUNE, 1950**

	Pounds	Percentage
Largemouth Bass.....	7	0.9
Bluegill.....	1	0.1
Redbreast.....	2	0.2
Warmouth.....	1	0.1
Channel Catfish.....	717	91.5
White Catfish.....	43	5.5
Speckled Bullhead.....	13	1.7
Total fish taken.....	784	100
Number trap days.....	1,185	
Average pounds per trap day.....	0.66	
Total pounds rough fish.....	773	98.7

**Table 25.**  
**MONTHLY POUNDAGES<sup>1</sup> OF CATFISH REPORTED<sup>2</sup> BY LICENSED**  
**WHOLESALE FRESH WATER FISH DEALERS FOR 1950**

January.....	1,086,197
February.....	979,644
March.....	1,021,547
April.....	886,906
May.....	824,271
June.....	691,562
July.....	685,459
August.....	1,162,977
September.....	813,841
October.....	855,864
November.....	1,316,424
December.....	1,327,106
Total.....	11,651,798

<sup>1</sup> All poundages reported as dressed weights were converted to rough weights by multiplying x 2.

<sup>2</sup> Includes the southern channel catfish, the white catfish, the speckled bullhead, and the yellow bullhead.

method. The haul seine contributes a major part of the catfish taken from the particular waters in which it is permitted each year and enables harvesting of great numbers of these species which could not otherwise be taken. Fish Management Division personnel supervise the overall fishing activities of the haul seine operations and gather information daily on the composition of the catch taken by this gear. This information assists in determining the status of the adult fish populations of the waters involved and is a source of supply of fish used in calculating growth and age, and in obtaining other valuable information. Maximum length now permitted on haul seines is 1600 yards with a minimum mesh of 3 inches stretched. Haul seines may be fished only on Monday through Friday between the hours of 3 AM and 5 PM. A four-months closed season on the operation of haul seines is in effect on both Lake George and Lake Okeechobee. Data on the monthly composition of the catch by haul seines may be found in Tables 12 and 13.

### SLAT BASKETS

Studies of the catch by wooden slat baskets were also made during this biennium in several Florida waters, including the Suwannee River, the Escambia River, and Yellow River. The slat basket is a cylindrical trap composed of wooden slats about 6 feet in length and is not over 20 inches in diameter. The downstream end or mouth has one or more funnels or throats also constructed of wooden slats into which the fish enters but cannot escape. Minimum

distance between slats at the head or upstream end must be 1½ inches to permit the escape of small fish. Experimental data on the catch by these devices indicate that the wooden slat basket is almost wholly specific for catfish, as other fish very seldom enter it. As a result, it is felt that this is one of the most effective means of taking catfish from suitable waters without interfering with the game fish populations. Data gathered on catch by wooden slat baskets is listed in Table 24.

### Wholesale Fresh Water Fish Dealers Reports

Since January 1950 a special effort has been made to obtain complete records of all fresh water fish taken by commercial fishermen, as required by Section 372.68 of the Statutes of Florida. Excellent cooperation was received from most of the dealers, resulting in data believed to be more than 90 percent complete. The total catfish taken, as reported by the dealers, is listed by month in Table 25.

### Special Reports and Publications

A number of special reports and publications have been issued covering certain phases of fisheries investigations and management, and are listed below. Some of these may be obtained from the office in Tallahassee.

*Management of Florida's Fresh Water Fisheries*, by John F. Dequine. Reprinted from Vol. 78 of the Transactions of the American Fisheries Society, 1950.

*Results of Some Tagging Studies of the Florida Largemouth Bass *Micropterus Salmoides Floridanus* (LeSueur)*, by John F. Dequine and Charles E. Hall, Jr. Reprinted from Vol. 79 of the Transactions of the American Fisheries Society, 1950.

*Is the Florida Smallmouth a Fable?* by John F. Dequine. Reprinted from the September 1949 Florida Wildlife (also under the title "*Identifying the Florida Basses*").

*The Lowdown on Balance*, by John F. Dequine. Reprinted from Florida Wildlife, May 1950.

*Results of Rough Fish Control Operations in Lake Apopka during December 1949 and January 1950*. Mimeographed report, dated 14 February 1950.

\**Recommendations for Management of Commercial Fishing Activities in Certain Waters of Florida*. Mimeographed report, dated 17 January 1950.

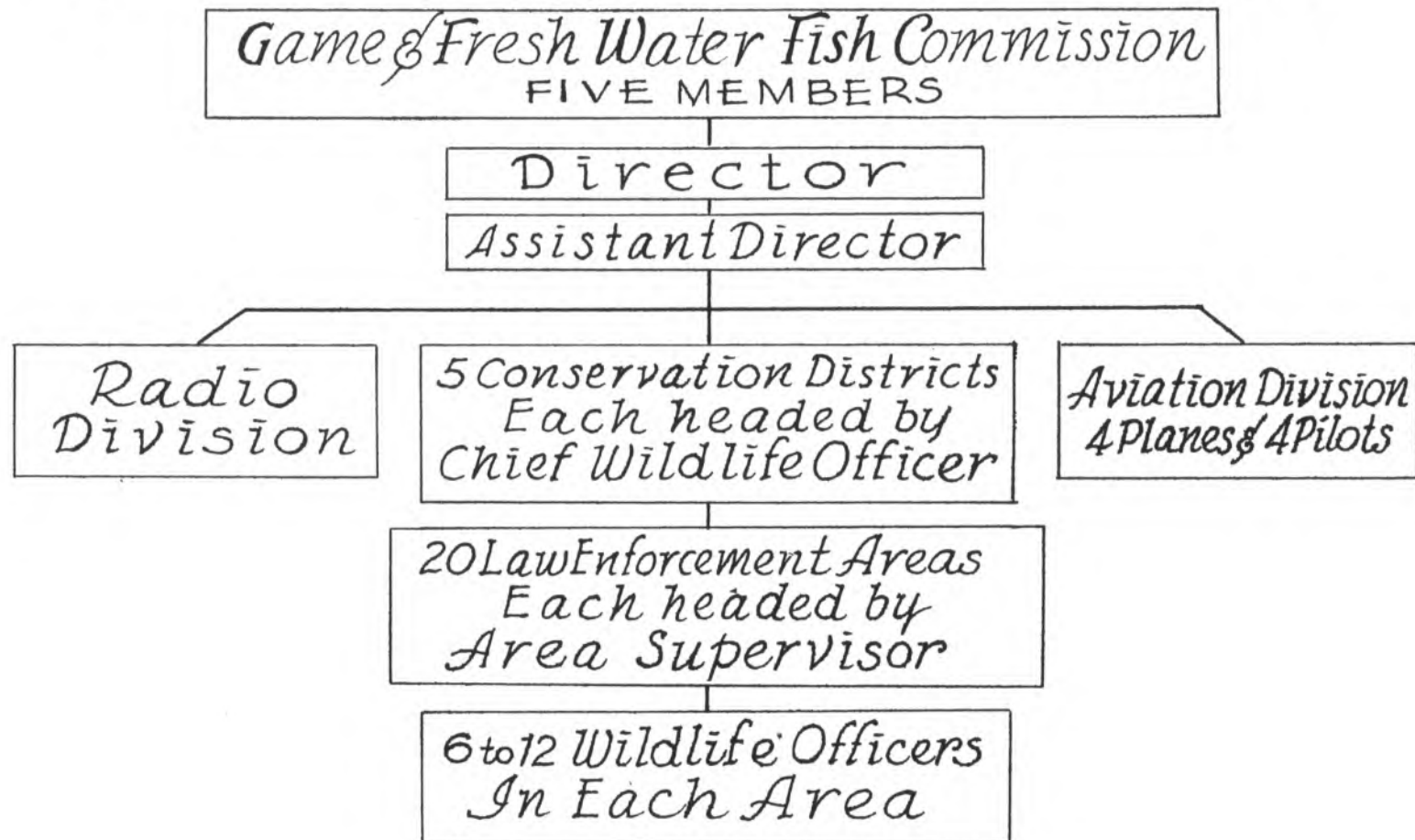
\**Report on Fisheries Investigation Projects for the Year Ending June 30, 1949*. Mimeographed report, dated 19 July 1949.

\**Rough Fish Control Operations in Lake Thonotosassa*. Mimeographed report, dated 15 May 1950.

\**A Report on Fisheries Investigations of the St. Johns River and Lake Okeechobee, 1948-50, With Recommendations for Management*. Mimeographed report, dated 18 August 1950.

\*Supply limited

# LAW ENFORCEMENT ORGANIZATION CHART





# LAW ENFORCEMENT DIVISION



**BEN McLAUHLIN**  
**Ass't Director**

JOHN SWIFT.....*Chief, First District*  
LESTER MIKELL....*Chief, Second District*  
FRANCIS VILLAR.....*Chief, Third District*  
CURTIS WRIGHT....*Chief, Fourth District*  
WALDO PRIEST.....*Chief, Fifth District*

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## LAW ENFORCEMENT

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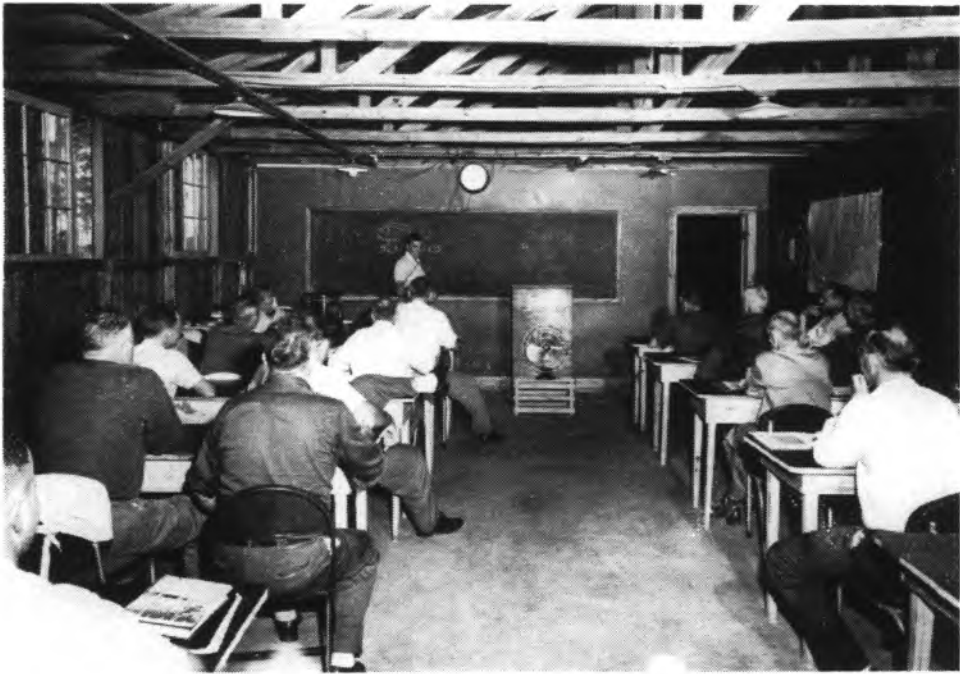
Florida's Wildlife Officers have the gigantic task of enforcing the game and fish laws and assisting in game and fish management on 39,000,000 acres of land and water. Few of us realize that Florida is the second largest state east of the Mississippi River, that we have the longest coast line in the entire nation, that we possess 30,000 named fresh water lakes, and that we are rated as second in the United States in woodland area. These facts show the tremendous responsibility facing our Wildlife Officers. Each Wildlife Officer in Florida is responsible for the game and fish on almost one-quarter million acres.

During the past two years a number of important policy changes have been made by the Commission in the Law Enforcement Division. This Division is under the direct supervision of the Commission's Assistant Director. Each of the five conservation districts is supervised by a Chief Wildlife Officer. Each district is subdivided into four law enforcement areas, headed by an Area Supervisor. The Area Supervisor and the Wildlife Officers under his jurisdiction are directly responsible for law enforcement activities in their territory.

To qualify as a Wildlife Officer, an individual must possess certain qualifications. First, he must be between the ages of 21 and 45 years at the time of employment. Second, he must be a high school graduate, or better. Third, he must be able to pass a rigid physical examination, and fourth, he must be a person of good character and good standing in the community in which he resides. Meeting the above minimum requirements, the prospective officer is then carefully screened and examined. If found to be fully qualified, he is then eligible for employment. All eligible applicants are given competitive examinations. Vacancies are filled by those making the highest score. Realizing the lack of professional training in game and fish management activities, and in law en-

forcement work, of the average person eligible for employment as a Wildlife Officer, the Commission established a training school for all its officers. The idea of creating a Wildlife Officers School was undoubtedly one of the foremost steps taken by the Game and Fresh Water Fish Commission in recent years. The Commission has been a firm believer that periodic education is a prime essential for an aggressive and efficient wildlife conservation department. The actual establishment of this school in July 1949 marks a milestone in a program that has been envisioned for some time. Florida is one of the few states in the nation that can boast of a

More than 200 Wildlife officers have attended the Commission's school. Future Wildlife officers receive extensive training here.



credible, educational program for both its new and old Wildlife Officers. The school as now established, is located at the old Montbrook Air Base, three miles west of the City of Williston. This abandoned air base, with its spacious grounds, splendid facilities and central location, afforded the ideal essentials of a state wildlife conservation school. The site is under a ten-year renewable

lease as a gift to the Commission from the City of Williston. The purpose of the school is to prepare new officers for their job and to keep our law enforcement body abreast of the rapid advancements in conservation. Wildlife conservation principles and techniques, like those of other organizations, change and improve through the years. The personnel of any organization will become stagnant if they are not currently presented with the latest available information concerning their work. The school also serves to rectify common errors frequently made by officers and to correct them on common misconceptions of law and related subjects.

The functions and program of the Wildlife Officers School ran as follows: Eight classes of 20 wildlife officers have attended the school to date; the school is not operated during the period from October through February because of the tremendous pressure brought about by the hunting season. A rigid 28-day curriculum was presented that was highly condensed; nothing being offered that was not essential or practical. The material presented during this month of training is almost equivalent to a semester's work in the average college. The school day commences at 6 A.M. and continues until 10 P.M. The material presented can best be classified in three categories: Lectures, demonstrations and field trips. Under the lectures, the following courses are given: The Constitution of Florida, Interpretation of the Wildlife Code, Commitment and Imprisonment, Subpoenas, Searches, Seizures, Forfeitures, Map Reading, Predator Mammals and Birds, Game Foods, First Aid, Fish Management, Game Management, Federal Court Procedure and many other subjects. Demonstrations included 2-way radio work, self defense training, construction of feeding and trapping devices, and other subjects. Field trips included studies in the Ocala National Forest, Marineland Studios, Silver

#### ENFORCEMENT BUDGET BY DISTRICTS

DISTRICT	NUMBER OF OFFICERS	OPERATING BUDGET
First	33	\$142,500.00
Second	37	142,500.00
Third	36	142,500.00
Fourth	29	108,000.00
Fifth	35	140,500.00
	<hr/>	<hr/>
Total	170	\$676,000.00

Springs, and Giest Wildlife farms. The Commission feels that the results of this professional improvement program in the Wildlife Officers School have been highly satisfactory and will show decided benefits to Florida's game and fish in the future years to come.

A statewide uniform salary and expense schedule has now been established. All Wildlife Officers are paid \$2400. per year for the first year's work. At the end of one year, if their services have been satisfactory, they are given a 5% increase and each year thereafter a 2% increase until they reach the maximum pay of \$2820. per year. Assistant Chiefs receive a salary of \$3,000. per year with the same annual percentage increases in salary until a maximum pay of \$3600. per year. Chief Wildlife Officers are paid \$4200. per year. Expense allowances are granted in conformity to State law, which provides an allowance of \$7.50 per 24-hour period when the officer is away from home, or his official headquarters, and \$2.00 per 24-hour period when he is on camp duty. Wildlife Officers cannot perform a superior job unless they are properly equipped. Much emphasis has been placed on the problem of properly equipping all officers. It was found that a saving of approximately \$700. per year could be effected by having officers travel in state-owned vehicles rather than personally owned vehicles where mileage was paid. Now all officers travel in state owned vehicles. By acquiring good boats and motors, swamp buggies, airboats, airplanes and other specialized equipment Florida's Wildlife Officers can now successfully cope with wildlife law enforcement problems.

During the past two years we have added 1 amphibian and 1 seaplane to our aviation department. We now have aircraft based in Districts 1, 2, 4 and 5. Land planes are in Districts 1 and 4; the amphibian in District 5, and the seaplane in District 2. The

## ARREST REPORT FOR BIENNIUM

1949-50

	Arrests	Convictions	Acquittals	Pending
District One	851	765	72	14
District Two	889	782	87	20
District Three	1,041	919	73	49
District Four	367	330	22	15
District Five	729	677	39	13
Totals	3,877	3,473	293	111

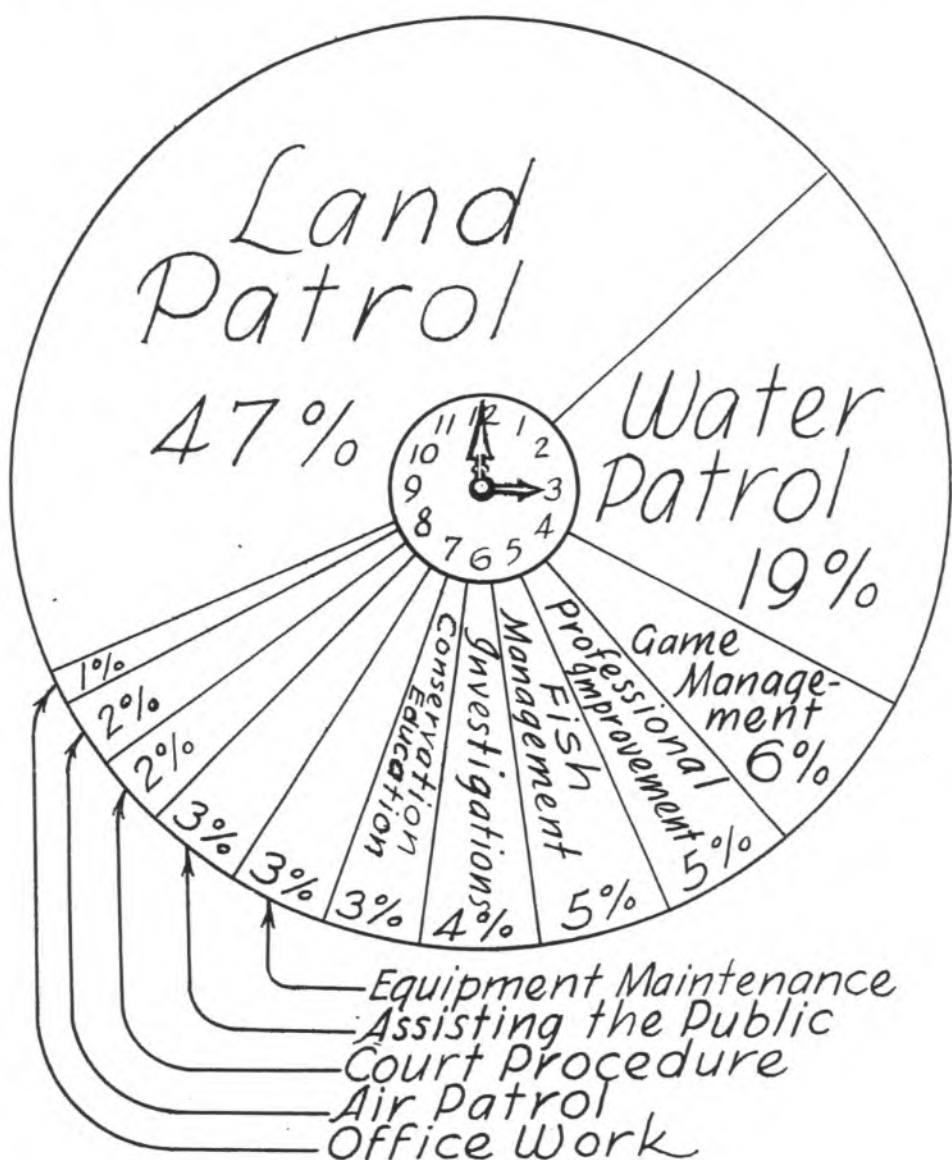


planes are used in our more heavily wooded areas to patrol for hunters, check on wildlife, and assist the ground vehicles by directing them to possible violators, the shortest and best way, thus saving time and equipment. They are also used as radio stations. All of our aircraft are equipped with 2-way radios that have a range of about 125 miles which makes it possible to send messages from one district to another. Our seaplane and amphibian are used in the same way, but are also used in checking boat licenses, fishing and water fowl hunters. They likewise are used in search and rescue work and in various game and fish management activities, including counts and population studies. It is anticipated that when sufficient funds are available these planes will be equipped with spraying devices and will be used to help control the hyacinth menace in Florida. All planes are kept in the best of condition and all flying Wildlife Officers are CAA licensed pilots. This makes for dependable and safe operations at all times. The tremendous visibility and huge area coverage afforded by the use of airplanes not only has brought about a greater efficiency in law enforcement, but has resulted in a great savings in operating expenses. The Aviation Section is headed by a Chief Pilot who is in charge of the entire statewide aviation program.

Commission equipment includes many special types. This air boat takes officers through swamps, marsh and glades.



# How the Average FLORIDA WILDLIFE OFFICER Distributes His Time



Along with the Commission policy of raising personnel standards and qualifications, it is likewise a policy of the Commission to improve the personal appearance of the officers. A standard uniform has been adopted and is now being worn by all Wildlife Officers. The present uniform consists of a trooper hat, black neck tie, khaki shirt, trousers, and jacket, and black shoes or boots. The new uniform was adopted upon the recommendation of a committee of Wildlife Officers who felt that a washable khaki was more practical, more economical to purchase and keep clean. Each officer now possesses 7 sets of uniforms so that a freshly laundered uniform may be worn each day of the week. The cost of uniforms is borne by each officer.

The Law Enforcement Division is required to perform many functions other than enforcing the game and fish laws. Wildlife Officers are now serving as game and fish management agents, educators, and public servants, rather than just "game wardens." The chart on page 101 will best illustrate how Florida's Wildlife Officers spend their time.

Two-way radio has increased the officers' range of operations. Portable pack sets as well as mobile units in planes and jeeps are standard equipment.



# INFORMATION AND EDUCATION DIVISION



CHARLES H. ANDERSON  
*Director, Information-Education*

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## INFORMATION-EDUCATION

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AN amazing growing public interest in the problems of wildlife conservation during the last two years resulted in tripling the importance and duties of the Information and Education division. During this biennial period, literally thousands of requests for conservation information and educational programs were received from public schools, youth organizations, women's clubs, sportsmen's associations, churches and civic organizations. These requests sought qualified speakers, up to date movies as well as an avalanche of educational and informative literature. In a measure, we succeeded in meeting most of the requests.

Numerous department heads were "drafted" to speak before the organizations. Wildlife officers were given short courses in public speaking as well as the operation of motion picture equipment. As a result, many of the officers themselves assisted greatly in keeping the public informed of the state's program designed to protect and improve our wildlife heritage.

The division of information and education itself has operated with but four regular and one part-time employees. Namely, they include the director, assistant director, a writer, a secretary and a combination mimeograph operator and stockroom clerk.

Throughout the two-year period, hundreds of newspaper releases have been turned out to the two major news services as well as all of Florida's daily and weekly newspapers. Our clipping service consistently disclosed that the service has maintained a high standard of success. Doubtlessly a major portion of this success resulted from the fact that the department has been kept under the guidance of qualified and experienced newspapermen. Under their direction no effort has ever been made to release "run-of-the-mine" publicity stories. Instead, each press release



was required to contain up to the minute and important news before it was sent out. This system likely has resulted in the department's high percentage of readers.

Throughout the period an evident growing national interest in Florida's hunting and fishing resulted in scores of requests from widely separated out-of-state newspapers, national magazines and professional writers seeking pictures, data and finished stories covering the two subjects. As a result, Florida has received invaluable publicity that doubtlessly resulted in the arrival of hundreds of out-of-state visitors and countless others who decided to remain as permanent residents.

Information and Education maintains close contact with all organized sportsman groups. I and E furnishes films, speakers and other entertainment.



### **Florida Wildlife Magazine**

FLORIDA WILDLIFE, the State Game and Fresh Water Fish Commission's monthly hunting, fishing and outdoor publication, has registered an amazing growth since its inception in June, 1947. Until September 1949 the magazine was mailed free of charge to subscribers. At that time the list of subscribers was approaching the 18,000 mark, which imposed a financial burden the Commission felt it no longer could bear. As a result, the magazine was placed on a \$1.00 annual subscription basis, and the list of subscribers dropped to approximately 5,000. Since then, through promotion and natural growth the subscription list nears 25,000. In

an effort to place the publication on a self-sustaining basis, select advertising was first accepted in the September 1950 issue and the magazine was enlarged from 24 pages to 48. FLORIDA WILDLIFE today has subscribers in every state in the Union as well as 28 foreign countries. Increased circulation and enlarged publication made it necessary to augment the staff handling circulation, advertising, and mailing. The staff today includes a circulation clerk, two advertising salesmen, a graphotype operator and a file clerk. Based on the normal influx of new subscriptions now being received, it is anticipated that the magazine eventually will reach 50,000.

### **Boys Industrial School Zoo**

The division of Information and Education took a long step forward in the field of wildlife education in 1950 when it assumed an active and important part in placing a wild animal and bird zoo at the Florida Boys' Industrial School, Marianna. After many months of careful planning with the school officials, the zoo installations were constructed exclusively by school students and the cages were full stocked by qualified game commission wildlife officers working under the direction of the division of informa-

Boys' school zoo serves two-fold purpose. Rehabilitation projects for boys, animals for Commission's fair exhibit.



tion and education. Today the zoo is recognized as one of the finest in the entire state and is maintained exclusively by honor students of the school. Formal opening of the zoo, during the summer of 1950, attracted statewide publicity and the attendance of high state officials and civic leaders from many sections of the state. In addition to its educational value to the youngsters at the school, the zoo has served as a "wildlife bank" for the Game Commission's fair exhibit. During the fall and spring months when the Commission's exhibit is on display at fairs and expositions in north, northwest, central and south Florida, all animals and birds used for that purpose are "borrowed" from the Marianna zoo.

### **Fair Exhibits**

During this two year period the Game and Fresh Water Fish Commission has very definitely entered the show business. In 1949 its 50 foot wildlife exhibit was booked at 24 fairs and expositions in various sections of the state. Increased demands for a similar exhibit in 1950 necessitated the construction of a second unit. Indications are that our exhibits will be viewed at more than 30 fairs this year by over 3,000,000 persons.

A new 50 foot exhibit was designed for use in 1950. It is a replica of two circus wagons and a steam calliope containing 10 cages of animals and birds and a 20 foot game fish aquaria. The animals and birds, a fair sampling of Florida's wildlife, attract great interest from natives and visitors alike wherever they are shown. The second unit, taking a space of but 10 feet, offers an opportunity to compare alligators and crocodiles.

The commission's game and fish exhibit was viewed by more than 3,000,000 people in 1950.



## Special Promotions

Fishing parties for youngsters ranging from three to 15 years of age probably have constituted the most noteworthy promotion of the division of information and education during the period covered by this report. One-day fishing parties for youths have been conducted at St. Petersburg, Orlando, Tallahassee, Panama City, and Lakeland, and the Commission has offered assistance in promoting similar parties in many other Florida cities. Prizes awarded to scores of youthful anglers at these parties are donated by local merchants. The Game Commission supplies hundreds of poles and lines to children who have none. In addition they provide thousands of fishing worms for bait. A staff of wildlife officers lend a helping hand and devote their energy to looking after the safety of the youngsters.

As an example of the success of these parties and the interest they have attracted, more than 5,000 youths attended this year's annual fishing party at Orlando. The affairs have become so popular that it has become utterly impossible to fulfill requests for similar fishathons that have been received from many other towns and cities throughout the state.

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Kids' Fishathons provide fishing for as many as 5,000 children in one day. Prizes are offered as well as lessons in conservation.





During recent years the Florida State Fair officials at Tampa have designated one entire day of the fair as Conservation Day, and the division of information has made an effort each year to supply an outstanding attraction on that day. During the 1950 Florida State Fair thousands of people were attracted to a reptile lecture and a rattlesnake milking demonstration offered through the courtesy of Ross Allen of the Ross Allen Reptile Institute at Silver Springs. During the last two years, at this same fair, the Game Commission in addition to its extensive wildlife and fish exhibit has operated a permanent motion picture theatre inside the fish and game building. The Little Theatre has a seating capacity of 250 and operates continuously from early morning until late at night during the annual 10-day stay there. Wildlife films relating to Florida thrill the audiences.

### **Motion Picture Films**

The division of information and education's film library has been considerably enlarged during the last two years. Despite the enlargement, demands for films by schools, clubs and other organizations have far exceeded the supply. Two additional color films designed to run 20 minutes each are now near completion and will be available soon.

At present the department's film library consists of sixteen short subjects on hunting and fishing. In most instances three copies of each title are in the library. The University of Florida has on permanent loan a thirty minute feature, distributed by this department, titled 'Our Heritage' for use in their Wildlife Conservation program.

During the 1949-50 period films booked through the Tallahassee office were distributed as follows:

Times shown	Florida Showings	Out of State	Total Audience
2016	1200	816	536,256

These figures do not include several hundred other shows presented by a number of qualified Wildlife Officers in their public relations duties, to schools and civic groups.

Also, in addition to the above figures, a selection of six films have been shown at the Commission's own Wildlife Theatre at the Florida State Fair, Tampa, for a total of twenty days to an estimated audience of 28,000.

Although the field of television has not been explored by the department a number of requests have been received. Several



of our films have been used on T. V. with outlets in the northern states.

Requests for literature covering Florida's wildlife have doubled in the past two years. During that period thousands of pamphlets, booklets and brochures have been distributed free of charge to interested groups and individuals in Florida as well as throughout the nation. A new pretentious book, covering Florida's fresh water fish and fishing and containing the names of all fresh water fish camps, will soon be completed. Another book describing poisonous reptiles, how to avoid them, and what to do in case of snake bite is nearing completion.

# COMMUNICATIONS DIVISION



J. RHETT McMILLIAN  
*Director of Communications*

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## COMMUNICATIONS DIVISION

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THE Communications Section was set up in late 1948 as a part of the Law Enforcement Division. In the fiscal year of 1950 the Division was given its own budget of \$18,560 and an operating framework.

At the present time the Division is composed of the Director and one engineer. One high school student is employed on part time basis under the Diversified Cooperative Training program, as assistant in the repair laboratory.

In the short time of its existence the Communications Division has grown into a full fledged unit of the Game Commission. Begun in 1948 as an experiment to assist the wildlife officer, the Division has earned itself a permanent position as a direct aid to the Law Enforcement Division.

The Division now has sixty two-way radios and ten portable pack sets in operation over the State. Before the end of the fiscal year the total number of radios in operation will number one hundred, giving each District approximately twenty two-way radio units each. These radios are installed in jeeps, trucks, airplanes, swamp buggies, hydroplanes and amphibians. The severe service demanded of such delicate equipment was a problem which required almost a year to successfully solve. Today, the Commission's radio program is well on its way to become one of the finest of its type in the nation.

The addition of the radio-equipped vehicles and airplanes has greatly extended the operating range of the wildlife officer. The radio-equipped officer can accomplish more work quicker than before; numerous arrests of violators and saving in wear and tear and time has resulted in the use of radio.

The function of the Communication Division is to install and maintain the two-way radios in the wildlife officer's vehicle. A well equipped repair laboratory is maintained in the field from which service and installation trips are made to the various law enforcement districts. At this laboratory are kept all the detailed reports and inspections required by the Federal Communications Commission which has direct authority over the operation of the radio system.

The largest project of the period, beside the installation of equipment, has been the entire modification of all radios in the field as required by the FCC and our own observations of best operation in the rugged type of service offered by conservation work. This change was made entirely in our own laboratory and by our own personnel.

With adequate ground and air communications the wildlife officer now patrols larger and more remote areas.



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# ACCOUNTING DIVISION

JOEL McKINNON  
*Administrative Ass't.*

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With the tremendous increase in receipts and disbursements over the past five years, more and more work has fallen on this Division.

For instance, during the fiscal year of 1946-47, the Commission took in \$833,297.62. In 1947-48 this was increased to \$1,024,616.59 which, in the one year period showed an increase of \$191,318.97. During the fiscal year 1948-49 the Commission collected \$1,124,927.79 showing another increase of \$100,311.20. In the past fiscal year 1949-50, the Commission collected \$1,226,204.06, thus showing an average increase over a three-year period, of over \$100,000 per year. On the basis of receipts for the first six months of the fiscal year 1950-51 the estimated income will reach more than \$1,300,000. Therefore, along with the expansion of the Game Commission, we have been increasing our revenue from the sale of hunting and fishing licenses, the collection of court costs, the sale of Magazine subscriptions, and magazine advertising. The following pages contain a complete statement of Commission receipts and expenditures for the fiscal years 1948-49 and 1949-50. We have also prepared a financial statement for the first six months of this fiscal year 1950-51 in order to bring this report up to date since we prepare these statements on a fiscal year rather than a calendar year.



**GAME & FRESH WATER FISH COMMISSION**  
**FINANCIAL STATEMENT JULY 1, 1948, thru JUNE 30, 1949**

	Item Total	Source Total	Total
Available Cash Balance, July 1.....			\$ 530,339.33
<b>RECEIPTS BY SOURCE</b>			
<b>Sale of Sporting License</b>			
Fishing.....	\$568,107.00		
Hunting.....	427,644.50		
Trapping.....	2,544.00		
Alien Hunting Permits.....	50.00		
U.S. Forest Permits.....	9,096.10	1,007,441.60	
Gulf Hammock Permits.....			
<b>Sale of Commercial License</b>			
Retail Fish Dealer.....	\$ 11,840.00		
Commercial Boat.....	1,914.20		
Wholesale Fish Dealer.....	1,750.00		
Boat for Hire.....	9,414.00		
Game Farm.....	180.00		
Wholesale Fur Dealers and Agents..	1,010.00		
Local Fur Dealers and Buyers.....	90.00		
Non-Resident Retail Fish Dealer...	50.00		
Non-Resident Commercial Boat....	10.00		
Guide License.....	260.00	26,518.20	
<b>Other Sources</b>			
Court Costs Collected.....	20,401.20		
Miscellaneous.....	5,684.57		
Confiscated Materials Sold.....	936.27		
Previous Year's License Collected...	5,035.00		
Rent on Dark Room.....	240.00		
Sale of Rough Fish.....	3,260.31		
Sale of Old Equipment.....	906.25		
Refunds.....	536.38		
Pittman-Robertson.....	53,568.01	90,967.09	
<b>Total Receipts</b> .....			\$1,124,927.79
<b>DISBURSEMENTS BY DEPARTMENT AND PURPOSE</b>			
<b>Administration</b>			
Salaries.....	\$ 22,333.60		
Travel.....	7,834.56		
Office Expense.....	2,482.17		
Telephone and Telegraph.....	4,613.86		
Postage and Shipping.....	7,286.19		
Printing.....	14,743.52		
Heat, Water, and Lights.....	176.29		
Equipment.....	6,162.66		
Maintenance of Equipment.....	209.58		
Gas, Oil, and Lubricants.....	593.07		
*Miscellaneous.....	4,706.73		
Rent.....	4,148.76		
Insurance.....	451.52		
Taxes on Land.....		\$ 75,742.51	
<b>Auditing</b>			
Salaries.....	12,198.05		
Office Expense.....	250.42		
Equipment.....	488.75		
Miscellaneous.....	52.00	12,989.22	

**FINANCIAL STATEMENT (Continued)**  
**JULY 1, 1948, thru JUNE 30, 1949**

	Item Total	Source Total	Total
<b>Law Enforcement</b>			
Salaries.....	443,427.51		
Travel.....	199,516.12		
Telephone and Telegraph.....	2,014.31		
Equipment.....	176,052.65		
Maintenance of Equipment.....	33,414.16		
Gas, Oil, and Lubricants.....	62,510.96		
Miscellaneous.....	20,652.44		
Rent (District No. 3).....	25.00		
Insurance.....	14,970.66		
Rewards.....	150.00	952,733.81	
<b>Fish Management</b>			
Salaries.....	9,624.96		
Travel.....	3,641.76		
Office Expense.....	125.30		
Equipment.....	4,360.20		
Maintenance of Equipment.....	346.99		
Gas, Oil, and Lubricants.....	999.01		
Miscellaneous.....	916.74		
Insurance.....	417.64	20,432.60	
<b>Blackwater Hatchery:</b>			
Salaries.....	4,844.33		
Travel.....	355.02		
Telephone and Telegraph.....	10.39		
Equipment.....	150.00		
Maintenance of Equipment.....	931.07		
Gas, Oil, and Lubricants.....	1,218.26		
Miscellaneous.....	652.31		
Insurance.....	179.24		
Dam Construction.....		8,340.62	
<b>Wewahitchka Hatchery</b>			
Salaries.....			
Heat, Water and Lights.....	23.80		
Equipment.....	321.54		
Maintenance of Equipment.....	25.83		
Miscellaneous.....	34.90	406.07	
<b>Winter Haven Hatchery</b>			
Salaries.....	8,119.25		
Travel.....	664.38		
Heat, Water, and Lights.....	156.05		
Equipment.....	225.00		
Maintenance of Equipment.....	1,121.85		
Gas, Oil, and Lubricants.....	1,231.08		
Miscellaneous.....	852.25		
Insurance.....	249.92	12,619.78	
<b>Rough Fish Control</b>			
Salaries.....	5,208.36		
Travel.....	1,471.14		
Equipment.....	1,397.29		
Maintenance of Equipment.....	579.88		

# FINANCIAL STATEMENT (Continued)

JULY 1, 1948, thru JUNE 30, 1949

	Item Total	Source Total	Total
Gas, Oil, and Lubricants.....	354.76		
Miscellaneous.....	2,307.97		
Insurance.....	169.19	11,488.59	
<b>Maintenance Engineer</b>			
Salaries.....	2,203.87		
Travel.....	1,936.55		
Telephone and Telegraph.....	74.15		
Equipment.....	12.60		
Maintenance of Equipment.....	118.03		
Gas, Oil, and Lubricants.....	822.83		
Miscellaneous.....	33.80		
Insurance.....	149.96	5,351.79	
<b>Lake Okeechobee Survey</b>			
Salaries.....	17,809.46		
Travel.....	5,069.34		
Telephone and Telegraph.....	7.25		
Equipment Purchased.....	4,975.66		
Maintenance of Equipment.....	656.89		
Gas, Oil, and Lubricants.....	917.38		
Miscellaneous.....	509.92		
Insurance.....	406.99	30,352.89	
<b>Fish Distribution</b>			
Salaries.....	600.00		
Travel.....	445.50		
Equipment.....	4,857.57		
Maintenance.....	585.18		
Gas, Oil, and Lubricants.....	102.27		
Miscellaneous.....	112.26		
Insurance.....	.19	6,702.97	
<b>St. Johns River Survey</b>			
Salaries.....	20,754.16		
Travel.....	2,318.30		
Equipment.....	4,413.85		
Maintenance.....	294.53		
Gas, Oil, and Lubricants.....	1,093.43		
Miscellaneous.....	654.71		
Insurance.....	447.61	29,976.59	125,671.90
<b>Department of Information and Education</b>			
Salaries.....	18,376.53		
Travel.....	5,607.84		
Office Supplies.....	279.96		
Postage and Shipping.....	543.49		
Printing.....	23,996.38		
Equipment.....	431.66		
Maintenance of Equipment.....	591.62		
Gas, Oil, and Lubricants.....	1,454.72		
Miscellaneous.....	1,445.30		
Insurance.....	337.73		
Promotional.....	5,159.44		58,224.67

# FINANCIAL STATEMENT (Continued)

JULY 1, 1948, thru JUNE 30, 1949

	Item Total	Source Total	Total
<b>Public Relations</b>			
Salaries.....	6,089.04		
Travel.....	4,382.25		10,471.29
<b>Legal and Investigation</b>			
Salaries.....	12,782.26		
Travel.....	11,015.06		
Telephone and Telegraph.....	223.73		
Equipment.....	296.50		
Maintenance of Equipment.....	865.50		
Gas, Oil, and Lubricants.....	1,576.55		
Miscellaneous.....	247.94		
Insurance.....	255.81		
Special Attorney Fees.....	4,859.32		32,122.67
<b>Pittman-Robertson:</b>			
Salaries.....	20,901.49		
Travel.....	6,849.63		
Office Supplies.....	79.20		
Telephone and Telegraph.....	67.06		
Postage and Shipping.....	577.90		
Equipment.....	2,371.31		
Maintenance of Equipment.....	1,216.41		
Gas, Oil, and Lubricants.....	2,762.39		
Miscellaneous.....	51,042.54		
Rent.....	160.00		
Insurance.....	708.59		
Land Purchased and Leased.....	69,874.80		
Revolving Fund.....	500.00		
Taxes on Land.....	1,178.48		158,289.79
<b>Quail Restocking—Project No. 1</b>			
Salaries.....	2,421.76		
Travel.....	1,265.74		
Equipment.....	2,276.35		
Maintenance of Equipment.....	36.67		
Gas, Oil, and Lubricants.....	259.42		
Miscellaneous.....	1,570.33		
Insurance.....	80.84		7,911.11
<b>Restocking—General</b>			
Bears.....	75.00		
Deer.....	21,550.00		
Pheasant.....	262.50		
Quail.....	325.00		
Quail Trapped.....	1,637.75		23,850.25
Turkey.....			
<b>Ocala National Forest</b>			
Salaries.....	5,587.10		
Travel.....	840.03		
Telephone and Telegraph.....	24.30		
Miscellaneous.....	58.00		6,509.43

**FINANCIAL STATEMENT (Continued)**  
**JULY 1, 1948, thru JUNE 30, 1949**

	Item Total	Source Total	Total
<b>Legislative Relief Act</b> (Griffins) . . . . .	2,500.00	.....	2,500.00
Total Disbursements . . . . .	.....	.....	\$1,467,016.65
<b>Less</b>			
Reserved for Hendry County Deer Fund . . . . .	.....	4,575.00	
Dixie County Deer Fund . . . . .	.....	90.00	
Cancelled Warrants . . . . .	.....	47.20	
Available Balance June 30 . . . . .	.....	.....	188,250.47
			<b>\$1,655,267.12</b>



**STATEMENT OF CASH RECEIPTS, DISBURSEMENTS, AND BALANCES  
FOR THE FISCAL YEAR ENDED JUNE 30, 1950**

Beginning Cash Balance July 1, 1949 .....		\$190,388.61
<b>RECEIPTS</b>		
License Sold by County Judges .....	\$978,800.25	
License Sold by State Office .....	30,865.60	
Revenue from Other Agencies .....	191,684.97	
Other Revenue .....	24,853.24	
Total Revenues—Schedule A .....	\$1,226,204.06	
Cancelled Warrants .....	9.00	
Revolving Fund (Gulf Hammock) .....	500.00	
Accounts Receivable from City of Tallahassee .....	2,524.06	
Judges Account .....	90.75	
Total Cash Receipts .....		1,229,327.87
Total Available .....		\$1,419,716.48
<b>DISBURSEMENTS</b>		
Salaries and Wages .....	\$ 605,776.80	
Professional Fees and Consulting Services .....	2,213.40	
Other Contractual Services .....	9,806.86	
Repairs to Equipment .....	29,445.87	
Parts and Fittings .....	17,401.28	
Automotive Equipment .....	16,923.70	
Other Expenses (Materials, Supplies, etc.) .....	488,060.65	
Total Expenditures Schedule B .....	\$1,169,628.56	
Purchase Deer Dixie County .....	90.00	
Total Disbursements .....		1,169,718.56
Ending Balance, June 30, 1950 .....		\$249,997.92

**STATEMENT OF CASH RECEIPTS, DISBURSEMENTS, AND BALANCES  
FOR THE PERIOD ENDING DECEMBER 31, 1950**

Beginning Cash Balance July 1, 1950.....		\$249,997.92
<b>RECEIPTS</b>		
License Sold by County Judges.....	\$611,498.75	
License Sold by State Office.....	25,853.20	
Revenue from Other Agencies.....	18,072.43	
Other Revenue.....	31,043.23	
Total Revenue—Schedule A.....	\$686,467.61	
Cancelled Warrants.....	52.00	
Dixie County Deer Fund.....	50.00	
Total Cash Receipts.....		686,569.61
Total Available.....		\$936,567.53
<b>DISBURSEMENTS</b>		
Salaries and Wages.....	\$339,439.39	
Professional Fees and Consulting Services.....	277.75	
Other Contractual Services.....	2,116.80	
Repairs to Equipment.....	27,674.45	
Parts and Fittings.....	15,473.65	
Automotive Equipment.....	34,346.76	
Other Expenses (Materials, Supplies, etc.).....	279,422.78	
Total Expenditures—Schedule B.....	\$698,751.58	
Judges Account.....	159.50	
Adjustment Account.....	274.04	
Total Disbursements.....		\$699,185.12
Ending Cash Balance December 31, 1950.....		\$237,382.41

# **GAME & FRESH WATER FISH COMMISSION**

SCHEDULE "A"	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>RECEIPTS BY SOURCE</b>						
<b>Sale of Sporting Licenses</b>						
Fishing.....	\$578,186.00			\$351,977.00		
Hunting.....	396,862.00			259,249.75		
Trapping.....	1,047.00			272.00		
Alien Hunting Permits.....	100.00					
U.S. Forest Permits.....	8,675.87					
Gulf Hammock Permits.....	3,120.00			2,045.00		
Apalachicola Bear Hunt.....				200.00		
Osceola Bear Hunt.....				200.00		
Charlotte County Permits.....				40.00		
Avon Park Permits.....	440.00	988,430.87		235.00	614,218.75	
<b>Sale of Commercial License</b>						
Retail Fish Dealer.....	13,335.00			10,380.00		
Wholesale Fish Dealer.....	2,250.00			1,750.00		
Commercial Boat.....	1,967.60			1,652.20		
Non-Resident Commercial Boat.....	40.00					
Non-Resident Fish Dealer.....	300.00			100.00		
Boat for Hire.....	10,993.00			10,836.00		
Guide.....	250.00			360.00		
Game Farm.....	260.00			275.00		
Wholesale Fur Dealer.....	1,310.00			460.00		
Local Fur Dealer.....	60.00	30,765.60		40.00	25,853.20	
<b>Other Sources</b>						
Court Costs Collected.....	14,723.89			5,411.22		
Miscellaneous.....	6,255.48			6,060.84		

Previous Years License Collected.....	2,705.25			3,446.75		
Sale of Magazine Advertising.....				3,827.20		
Sale of Magazine Subscriptions.....	12,585.30			9,029.75		
Sale of Magazine Single Copies.....	47.89			72.14		
Sale of Old Equipment.....	880.70			221.50		
Refunds.....	83.18			63.82		
Rent on Dark Room.....	60.00					
Charlotte County Grazing Lease.....				169.00		
Sale of Rough Fish.....	4,883.89			2,741.01		
Pittman-Robertson.....	164,725.21			15,352.43		
Sale of Confiscated Materials.....	57.50					
Total Receipts.....		\$207,007.59	\$ 1,226,204.06		\$ 46,395.66	\$ 686,467.61

SCHEDULE "B"	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS</b>						
<b>Administration</b>						
Salaries.....	18,364.21			13,323.72		
Professional Fees and Services.....	208.25			50.00		
Repairs to Equipment.....	143.34			259.72		
Repairs to Buildings.....				1,587.00		
Printing and Binding.....	9,268.48			8,416.05		
Publication of Notices.....	589.70			443.60		
Heat, Gas, Light, Power, Water.....	99.75			613.85		
Postage.....	4,475.04			4,259.28		
Telephone and Telegraph.....	9,857.45			5,282.97		
Freight and Express.....	976.36			552.69		
Travel—Employees.....	2,840.17			1,536.24		
Travel—Other than Employees.....	3,185.99					
Storage.....				37.75		
Clean, Paint, and Waste Remodeling..				200.00		
Other Contractual Services.....	72.15			58.50		

# FINANCIAL STATEMENT—Continued

	JULY 1, 1959, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>Administration (Continued)</b>						
Parts and Fittings.....	145.28			191.31		
Lumber and Wood Products.....				33.28		
Other Building Materials.....	49.26			19.50		
Fiber and Textile Products.....				3.06		
Stationery and Office Supplies.....	2,302.19			1,727.64		
Gas, Oil, and Lubricants.....	959.37			638.02		
Fuel.....				13.35		
Hand Tools and Minor Equipment...	184.67			19.85		
Cleaning and Laundry Supplies.....	135.00			199.47		
Household Supplies.....	32.19			12.10		
Rental of Buildings, Offices, and Land	5,621.94			1,929.00		
Rental of Equipment.....	9.00			2.50		
Insurance—Buildings and Equipment.	69.89			67.43		
Insurance—Liability and Compensation	278.75			81.36		
Official Bonds.....	17.12			28.94		
Registrations, Dues, etc.....	97.90			218.69		
Office Furniture and Equipment.....	446.10			50.00		
Household and Laundry Equipment...				225.00		
Other Equipment.....	135.00			36.00		
Buildings and Fixed Equipment.....	6,500.00			40,226.74		
Other Rentals.....	1.00					
Laundry Service.....	1.65		67,067.20			82,344.61
<b>Fiscal Branch:</b>						
Salaries.....	13,207.58			7,112.50		



Repairs to Equipment . . . . .	38.50		18.90	
Printing and Binding . . . . .	143.75			
Travel—Employees . . . . .	73.12			
Stationery and Office Supplies . . . . .	99.37		26.18	
Insurance—Liability & Compensation . . . . .	26.27		43.65	
Official Bonds . . . . .			19.29	
Office Furniture and Equipment . . . . .	240.82	13,829.41	243.88	7,464.40
<b>Law Enforcement</b>				
Salaries . . . . .	\$403,537.07		\$237,150.15	
Repairs to Equipment . . . . .	22,493.56		23,894.73	
Printing and Binding . . . . .	519.70		149.90	
Telephone and Telegraph . . . . .	83.52		362.84	
Travel—Employees . . . . .	125,139.10		26,790.34	
Storage . . . . .	227.89		154.15	
Clean, Paint, and Waste Removal . . . . .	122.00		221.50	
Other Contractual Services . . . . .	889.75		501.50	
Parts and Fittings . . . . .	12,705.98		13,731.90	
Lumber and Wood Products . . . . .	288.70		441.05	
Other Building Materials . . . . .	536.77		941.90	
Fiber and Textile Products . . . . .	126.02		14.12	
Chemical and Laboratory Supplies . . . . .	101.20			
Gas, Oil, and Lubricants . . . . .	67,938.65		35,430.61	
Forage and Animal Supplies . . . . .	1,511.79		764.51	
Hand Tools and Minor Equipment . . . . .	682.72		1,087.04	
Clothing . . . . .	4.68		70.55	
Other Supplies . . . . .	2.05		57.53	
Insurance—Buildings and Equipment . . . . .	7,232.88		10,499.22	
Insurance—Liability & Compensation . . . . .	4,082.51		1,457.12	
Official Bonds . . . . .	377.02		998.44	
Registrations, Dues, etc . . . . .	558.25		474.25	
Automotive Equipment . . . . .	5,647.67		26,690.02	
Other Equipment . . . . .	9,747.85		17,153.39	
Building and Mechanical Supplies . . . . .	80.84		46.55	
Rewards for Apprehension of Law Violators . . . . .	140.00			

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>Law Enforcement (Continued)</b>						
Information and Evidence of Law Violation.....				91.71		
Cleaning and Laundry Supplies.....	11.75			58.66		
Food Products.....	407.31			2,220.36		
Rental of Buildings, Offices, Land....	99.00			127.50		
Household Supplies.....	10.75			217.54		
Office Furniture and Equipment.....	133.13			475.00		
Livestock not Intended for Slaughter..	2,366.00			1,746.00		
Rental of Equipment.....	204.50			66.50		
Other Rentals.....	1.00					
Heat, Light, Power, and Mechanical Equipment.....	125.00					
Laundry Services.....				285.02		
Stationery and Office Supplies.....				270.75		
Photography and Blue Printing.....				10.50		
Freight and Express.....				154.19		
Professional Fees and Services.....				210.00		
Heat, Lights, Gas, etc.....				152.44		
Travel—Other than Employees.....				15.00		
Fuel.....			668,136.61	87.41		405,271.97
<b>Fish Management Division:</b>						
Salaries.....	10,986.25			5,987.17		
Repairs to Equipment.....	195.00			97.10		
Printing and Binding.....	71.50			56.85		

Freight and Express.....				
Travel—Employees.....	1,935.88		678.74	
Storage.....	1.00		5.50	
Other Contractual Services.....	38.33		2.50	
Parts and Fittings.....	183.07		24.96	
Lumber and Wood Products.....			7.35	
Other Building Materials.....			90	
Fiber and Textile Products.....	168.60			
Stationery and Office Supplies.....	74.34		25.40	
Chemical and Laboratory Supplies....	126.45		5.55	
Gas, Oil, and Lubricants.....	907.36		481.90	
Hand Tools and Minor Equipment...	54.83		12.40	
Building and Mechanical Supplies.....			2.75	
Other Supplies.....	60			
Insurance—Building and Equipment...	106.59		135.72	
Insurance—Liability & Compensation	107.21		41.41	
Official Bonds.....	5.70		14.47	
Registration, Dues, etc.....	9.00		4.50	
Engineering and Scientific Equipment				
Other Equipment.....				
Agriculture, Horticulture, and Park				
Supplies.....	368.00			
Clothing.....	14.57			
Office Furniture and Equipment.....	100.40			
Books.....	7.50	15,462.18	7,585.17	
<b>Blackwater F/M Station</b>				
Salaries.....	4,616.00		2,402.33	
Repairs to Equipment.....	148.23		28.30	
Heat, Gas, Lights, etc.....	7.55		13.06	
Telephone and Telegraph.....				
Freight and Express.....				
Travel—Employees.....	143.50		51.55	
Clean, Paint, and Waste Removal.....				
Parts and Fittings.....	21.91		24.35	
Lumber and Wood Products.....				

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>Blackwater F/M Station (Cont)</b>						
Other Building Materials.....	47.93			16.87		
Fiber and Textile Products.....	9.15			119.96		
Other Materials.....						
Gas, Oil and Lubricants.....	228.73			161.11		
Agriculture, Horticulture, and Park Supplies.....	421.21			309.15		
Hand Tools and Minor Equipment.....	27.90					
Building and Mechanical Supplies.....						
Other Supplies.....						
Rental of Equipment.....						
Insurance—Building and Equipment.....	43.48			53.39		
Insurance—Liability & Compensation.....	43.64			15.96		
Official Bonds.....	3.80			9.65		
Registration, Dues, etc.....	2.25	5,765.28		4.50	3,210.18	
<b>Wewahitchka F/M Station</b>						
Salaries.....				1,207.50		
Repairs to Equipment.....	6.10			233.08		
Heat, Gas, Lights, etc.....	21.92			11.88		
Travel—Employees.....				425.98		
Clean, Paint, and Waste Removal.....						
Parts and Fittings.....	2.70			89.03		
Lumber and Wood Products.....	4.24					
Other Building Materials.....	30.72					
Fiber and Textile Products.....						

Gas, Oil, and Lubricants.....			741.58	
Agriculture, Horticulture, and Park Supplies.....	35.05		41.90	
Hand Tools and Minor Equipment...	6.15		.45	
Building and Mechanical Supplies.....			5.00	
Clothing.....				
Other Supplies.....				
Insurance—Building and Equipment...			147.50	
Insurance—Liability & Compensation			8.18	
Official Bonds.....			4.83	
Registrations, Dues, etc.....			4.50	
Other Contractual Services.....	1,988.96	2,095.84		2,921.41
<b>Winter Haven F/M Station</b>				
Salaries.....	8,225.25		3,964.84	
Repairs to Equipment.....	264.30		113.81	
Heat, Gas, Lights, etc.....	80.43		39.95	
Telephone and Telegraph.....	93.46		34.27	
Freight and Express.....			12.30	
Travel—Employees.....	360.47		129.88	
Clean, Paint, and Waste Removal.....				
Other Contractual Services.....	20.00			
Parts and Fittings.....	120.34		36.66	
Lumber and Wood Products.....	20.72		32.03	
Structural Metals.....				
Lands.....	75.00			
Cleaning and Laundry Supplies.....	.50			
Other Building Materials.....	148.98		7.55	
Fiber and Textile Products.....	26.52		806.12	
Chemical and Laboratory Supplies...	47.50		241.00	
Gas, Oil, and Lubricants.....	1,074.68		375.14	
Agriculture, Horticulture, and Park Supplies.....				
Hand Tools and Minor Equipment...	125.20		26.40	
Building and Mechanical Supplies.....				
Other Supplies.....			4.00	

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1959, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>Winter Haven F/M Station (Cont.)</b>						
Insurance—Buildings and Equipment.	43.48			64.33		
Insurance—Liability & Compensation	78.27			27.88		
Official Bonds.....	7.61			19.29		
Registrations, Dues, etc.....	138.10			2.25		
Other Equipment.....						
Clothing.....	23.91	10,974.72			5,937.70	
<b>Rough Fish Control</b>						
Salaries.....	3,570.55			3,985.00		
Repairs to Equipment.....	174.03			207.28		
Heat, Gas, Lights, etc.....				7.90		
Freight and Express.....						
Travel—Employees.....	690.01			505.74		
Cleaning, Paint, and Waste Removal						
Other Contractual Services.....	20.00					
Parts and Fittings.....	111.72			245.05		
Lumber and Wood Products.....	5.15			43.95		
Other Building Materials.....	36.87			26.02		
Fiber and Textile Products.....	525.36			175.30		
Other Materials.....						
Chemical and Laboratory Supplies....						
Gas, Oil, and Lubricants.....	682.82			507.45		
Building and Mechanical Supplies.....						
Clothing.....	62.45					
Household Supplies.....						



Other Supplies .....	20.95		53.50	
Insurance—Building and Equipment ..	121.29		183.33	
Insurance—Liability & Compensation ..	34.43		21.01	
Official Bonds .....	1.90		9.65	
Registrations, Dues, etc. ....	2.25		2.25	
Household and Laundry Equipment .....				
Office Furniture and Equipment .....	60.75			
Heat, Light, and Power Equipment .....			19.95	
Other Equipment .....	70.00		75.00	
Hand Tools and Minor Equipment .....	52.05		33.84	
Food Products .....	71.67	6,314.23		6,502.22
<b>Okeechobee F/M Station</b>				
Salaries .....	14,490.26		\$ 5,950.97	
Repairs to Equipment .....	795.20		515.41	
Freight and Express .....			4.52	
Travel—Employees .....	1,956.01		992.37	
Clean, Paint, and Waste Removal .....				
Parts and Fittings .....	170.19		87.01	
Lumber and Wood Products .....	35.44		6.48	
Other Building Materials .....	68.41		48.07	
Fiber and Textile Products .....	16.30		101.38	
Stationery and Office Supplies .....				
Chemicals and Laboratory Supplies ..	57.33		4.19	
Gas, Oil, and Lubricants .....	1,800.70		688.84	
Forage and Animal Supplies .....			22.60	
Hand Tools and Minor Equipment .....	166.34		61.26	
Building and Mechanical Supplies .....	1.50		7.45	
Other Supplies .....	1.53			
Rental of Equipment .....			9.47	
Insurance—Building and Equipment ..	214.66		202.17	
Insurance—Liability & Compensation ..	158.66		41.57	
Official Bonds .....	13.32		24.12	
Registration, Dues, etc. ....	8.60		5.50	
Office Furniture and Equipment .....	25.00			
Engineering and Scientific Equipment .....				

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>Okeechobee F/M Station (Cont.)</b>						
Automotive Equipment.....				650.00		
Other Equipment.....	205.80					
Other Contractual Services.....	10.00					
Cleaning and Laundry Supplies.....	3.13					
Clothing.....	9.30					
Lands.....	1,200.00	21,407.68			9,423.38	
<b>Maintenance Engineer</b>						
Salaries and Wages.....	1,875.00					
Repairs to Equipment.....	138.89					
Travel—Employees.....	899.87					
Parts and Fittings.....	90.24					
Masonry and Road Materials.....	.70					
Other Building Materials.....	5.06					
Gas, Oil, and Lubricants.....	717.41					
Hand Tools and Minor Equipment.....	65.39					
Clothing.....	10.75					
Other Supplies.....	2.05					
Insurance—Buildings and Equipment.....	37.27					
Insurance—Liability & Compensation.....	22.86					
Official Bonds.....	1.90					
Registrations, Dues, etc.....	2.25					
Other Equipment.....		3,869.64				

**Fish Distribution**

Salaries and Wages.....	1,759.50	
Repairs to Equipment.....	223.57	
Travel—Employees.....	593.04	
Parts and Fittings.....	28.98	
Other Building Materials.....	4.05	
Gas, Oil, and Lubricants.....	1,199.04	
Hand Tools and Minor Equipment....	3.95	
Other Supplies.....	8.98	
Insurance—Buildings and Equipment..	62.11	
Insurance—Liability and Compensation	18.74	
Official Bonds.....	1.90	
Registrations, Dues, etc.....	2.25	
Other Equipment.....		3,906.11

**St. Johns F/M Station**

Salaries.....	15,940.00	7,756.00
Repairs to Equipment.....	378.68	145.45
Postage.....		32
Freight and Express.....		
Travel—Employees.....	1,631.54	675.98
Cleaning, Paint, and Waste Removal..		
Parts and Fittings.....	115.83	82.27
Lumber and Wood Products.....	3.00	7.20
Other Building Materials.....	43.58	
Fiber and Textile Products.....		6.05
Stationery and Office Supplies.....		7.75
Chemical and Laboratory Supplies....	61.85	28.67
Gas, Oil, and Lubricants.....	1,598.75	522.01
Fuel.....		
Agricultural, Horticultural, and Park Supplies.....	11.27	
Hand Tools and Minor Equipment....	165.57	18.36
Building and Mechanical Supplies....		
Clothing.....	9.30	4.20
Other Supplies.....	.25	

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 1, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>DISBURSEMENTS BY DEPARTMENTS (Continued)</b>						
<b>St. Johns F/M Station (Cont.)</b>						
Insurance—Building and Equipment..	202.98			355.35		
Insurance—Liability & Compensation	130.28			53.32		
Official Bonds.....	7.61			28.94		
Registrations, Dues, etc.....	4.50			2.25		
Household and Laundry Equipment.....						
Telephone and Telegraph.....	3.95					
Travel—Other than Employees.....	146.40					
Other Contractual Services.....	18.50					
Other Equipment.....	357.26	20,831.10			9,694.12	
<b>District A Supervisor</b>						
Salaries.....				520.00		
Travel—Employees.....				95.17		
Heat, Light, and Mechanical Equipment.....			90,626.78	65.00	680.17	45,954.35
<b>INFORMATION AND EDUCATION</b>						
<b>Administration</b>						
Salaries.....	24,068.81			7,943.34		
Repairs to Equipment.....	397.11			45.58		
Printing and Binding.....	165.85			374.18		
Photographing and Blue Printing.....	9.00			4.00		
Postage.....	230.00			10.00		
Travel—Employees.....	6,442.04			858.67		

Storage . . . . .	12.00		6.00	
Information and Credit Service . . . . .	330.00		241.10	
Parts and Fittings . . . . .	166.28		82.59	
Stationery and Office Supplies . . . . .	1,595.47		575.18	
Gas, Oil, and Lubricants . . . . .	1,311.16		238.12	
Insurance—Building and Equipment . . . . .	97.83		48.11	
Insurance—Liability & Compensation . . . . .	246.05		51.14	
Official Bonds . . . . .	15.22		28.94	
Registrations, Dues, etc. . . . .	39.00		2.25	
Travel—Other than Employees . . . . .	38.40			
Other Building Materials . . . . .	.45			
Hand Tools and Minor Equipment . . . . .	44.18			
Office Furniture and Equipment . . . . .	4,035.05			
Educational Equipment . . . . .	329.00	39,572.90		10,509.20
<b>Magazine Publication</b>				
Salaries . . . . .			5,606.72	
Repairs to Equipment . . . . .			280.86	
Printing and Binding . . . . .	19,043.55		19,374.85	
Photographing and Blue Printing . . . . .	22.00		447.33	
Postage . . . . .	300.00		981.19	
Freight and Express . . . . .			13.94	
Travel—Employees . . . . .			1,762.04	
Cleaning, Paint, and Waste Removal . . . . .			10.00	
Other Contractual Services . . . . .	528.50		533.60	
Parts and Fittings . . . . .			37.94	
Fiber and Textile Products . . . . .			15.75	
Other Materials . . . . .			375.00	
Stationery and Office Supplies . . . . .	278.34		582.94	
Gas, Oil, and Lubricants . . . . .			581.26	
Hand Tools and Minor Equipment . . . . .			8.45	
Rental of Equipment . . . . .				
Insurance—Building and Equipment . . . . .			52.74	
Insurance—Liability & Compensation . . . . .			21.19	
Official Bonds . . . . .			9.65	
Awards, Gratuities, etc. . . . .				

# FINANCIAL STATEMENT—Continued

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>INFORMATION AND EDUCATION (Continued)</b>						
<b>Magazine Publication (Cont.)</b>						
Registrations, Dues, etc.....				4.50		
Office Furniture and Equipment.....				25.20		
Other Equipment.....		20,172.43		25.20	30,750.35	
<b>Photography</b>						
Salaries.....				1,899.96		
Repairs to Equipment.....				187.44		
Photographing and Blue Printing.....				15.44		
Travel—Employees.....				869.62		
Other Contractual Services.....						
Parts and Fittings.....				19.12		
Stationery and Office Supplies.....				544.50		
Gas, Oil, and Lubricants.....				403.96		
Hand Tools and Minor Equipment.....				25.80		
Educational Supplies.....						
Insurance—Buildings and Equipment.....				121.13		
Insurance—Liability & Compensation.....				12.00		
Official Bonds.....				4.83		
Registrations, Dues, etc.....				5.50		
Engineering and Scientific Equipment.....						
Automotive Equipment.....				947.00		
Other Equipment.....				384.69	5,440.99	
<b>Promotional</b>						
Repairs to Equipment.....	320.17					



Printing and Binding.....	3,131.59				
Photographing and Blue Printing.....	21.00				
Freight and Express.....					
Travel—Employees.....	683.00				
Cleaning, Painting, and Waste Removal.....	347.50				
Other Contractual Services.....	27.50				
Parts and Fittings.....	116.77				
Lumber and Wood Products.....	70.01				
Other Building Materials.....	124.58				
Fiber and Textile Products.....	2.57				
Other Materials.....					
Stationery and Office Supplies.....	216.45				
Other Materials.....					
Forage and Animal Supplies.....	518.71				
Hand Tools and Minor Equipment.....	587.50				
Food Products.....	18.00				
Educational Supplies.....	478.77				
Household Supplies.....	5.00				
Other Supplies.....	504.51				
Other Equipment.....	420.00	7,593.63			
<b>Fairs</b>					
Repairs to Equipment.....				520.95	
Printing and Binding.....				27.26	
Freight and Express.....				60.00	
Travel—Employees.....				504.75	
Cleaning, Painting, and Waste Removal.....				358.00	
Other Contractual Services.....				145.20	
Parts and Fittings.....				122.49	
Lumber and Wood Products.....				187.05	
Other Building Materials.....				52.40	
Fiber and Textile Products.....				16.58	

# FINANCIAL STATEMENT—Continued

	JULY 1, 1959, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>INFORMATION AND EDUCATION</b> (Continued)						
<b>Fairs (Continued)</b>						
Other Materials.....				8.46		
Gas, Oil, and Lubrication.....				120.42		
Forage and Animal Supplies.....				372.57		
Hand Tools and Minor Equipment...				61.97		
Household Supplies.....				4.50		
Other Supplies.....				276.23		
Insurance—Buildings and Equipment.				12.48		
Other Equipment.....			67,338.96	35.00	2,886.31	49,586.85
<b>Law Enforcement School</b>						
Salaries and Wages.....	7,166.47					
Professional Fees and Consulting Service.....	1,603.15					
Repairs to Equipment.....	128.03					
Printing and Binding.....						
Heat, Water, and Lights.....	149.75					
Postage.....	1.49					
Telephone and Telegraph.....	92.14					
Travel—Employees.....	2,680.17					
Travel—Other than Employees.....	619.57					
Cleaning and Waste Removal.....	28.00					
Laundry Services.....	77.57					
Other Contractual Services.....	33.25					
Parts and Fittings.....	107.56					
Lumber and Wood Products.....	6.66					

Other Building Materials.....	55.72
Stationery and Office Supplies.....	167.35
Gas, Oil, and Lubricants.....	659.37
Fuel.....	172.90
Hand Tools and Minor Equipment...	80.70
Clothing.....	54.65
Cleaning and Laundry Supplies.....	176.95
Food Products.....	5,151.26
Educational Supplies.....	61.90
Household Supplies.....	929.57
Rental of Equipment.....	10.00
Insurance—Buildings and Equipment.	43.48
Insurance—Liability & Compensation	51.06
Official Bonds.....	1.90
Requisitions, Dues, etc.....	2.25
Household, Laundry, and Equipment.	833.64
Office Furniture and Equipment.....	27.76
Other Supplies.....	56.90

21,231.17

**Legal and Investigation**

Salaries and Wages.....	16,483.76
Professional Fees and Consulting Services.....	
Repairs to Equipment.....	1,141.97
Photographing and Blue Printing.....	13.50
Travel—Employees.....	10,288.19
Storage.....	61.65
Cleaning, Painting, and Waste Re- moval.....	306.00
Other Contractual Services.....	674.00
Parts and Fittings.....	1,268.93
Other Building Materials.....	1.15
Gas, Oil, and Lubrication.....	2,732.17
Forage, Stable, and Animal Supplies..	30.35
Hand Tools and Minor Equipment...	404.17
Clothing.....	43.84

# FINANCIAL STATEMENT—Continued

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>INFORMATION AND EDUCATION</b> (Continued)						
<b>Legal and Investigation (Cont.)</b>						
Other Supplies .....	16.68					
Rental of Equipment .....	1.00					
Other Rental .....	.45					
Insurance—Buildings and Equipment .....	120.31					
Insurance—Liability & Compensation .....	164.86					
Official Bonds .....	11.41					
Registrations, Dues, etc .....	47.00					
Information and Evidence of Law Violation .....	211.20					
Office Furniture and Equipment .....	67.57					
Automotive Equipment .....	5,215.90					
Other Equipment .....	906.70		40,212.76			
<b>GAME MANAGEMENT DIVISION</b>						
<b>Pittman-Robertson</b>						
Salaries .....	40,878.80			24,764.92		
Professional Fees and Services .....	402.00			17.75		
Repairs to Equipment .....	1,881.42			1,060.15		
Printing and Binding .....	1,431.91			583.25		
Postage .....	40.69			2.70		
Photographing and Blue Printing .....	2.00					
Telephone and Telegraph .....	19.17			2.54		
Freight and Express .....	237.01			7.31		
Travel—Employees .....	7,982.27			3,723.63		

Cleaning, Painting, and Waste Removal.....	150.00	48.00
Other Contractual Services.....	4,000.92	845.00
Parts and Fittings.....	519.24	607.13
Masonry and Road Materials.....		1.30
Lumber and Wood Products.....	1,836.07	394.35
Other Building Materials.....	2,588.10	416.65
Fiber and Textile Products.....	2.68	.25
Other Materials.....		1.29
Stationery and Office Supplies.....	113.86	269.07
Chemical and Laboratory Supplies.....	43.53	26.83
Medical, Surgical, and Dental Supplies.....	2.50	5.50
Gas, Oil, and Lubrication.....	4,797.61	2,731.98
Agricultural, Horticultural, and Park Supplies.....	4,881.56	150.55
Forage and Animal Supplies.....	1,255.96	1,156.17
Hand Tools and Minor Equipment.....	1,464.29	195.70
Building and Mechanical Supplies.....	2.95	1.25
Clothing.....	12.50	
Cleaning and Laundry Services.....	9.94	7.50
Food Products.....		3.00
Household Supplies.....		114.61
Other Supplies.....	53.35	56.35
Rental of Equipment.....	421.83	175.50
Insurance—Building and Equipment.....	437.93	709.93
Insurance—Liability & Compensation.....	446.08	148.20
Official Bonds.....	62.80	72.35
Registrations, Dues, etc.....	120.45	53.72
Taxes and Assessments.....	40.39	186.10
Household and Laundry Equipment.....	350.70	
Office Furniture and Equipment.....	341.64	
Automotive Equipment.....	6,060.13	6,059.74
Agricultural, Horticultural and Park Equipment.....	3,810.41	135.00
Other Equipment.....	223.00	536.53

# **FINANCIAL STATEMENT—Continued**

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 1, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>GAME MANAGEMENT DIVISION</b> <b>(Continued)</b>						
<b>Pittman-Robertsot (Continued)</b>						
Lands.....	51,374.80			51,022.50		
Travel other than Employees.....	24.00					
Rental of Office Buildings and Land.....	1,710.85					
Books.....	26.00					
Livestock not for Slaughter.....	5,532.75					
Building and Fixed Equipment.....	3,201.82		148,795.91			96,294.30
<b>State Quail Project No. 1</b>						
Salaries.....	3,740.00			1,800.00		
Repairs to Equipment.....	280.42			43.29		
Travel—Employees.....	828.79			481.25		
Other Contractual Services.....	1,126.00			30.50		
Parts and Fittings.....	51.69			34.84		
Other Building Materials.....	225.98			54.43		
Fiber and Textile Products.....	2.90			2.45		
Gas, Oil, and Lubrication.....	373.90			204.75		
Forage and Animal Supplies.....	455.33			66.21		
Rental of Building, Offices, and Land.....				120.00		
Insurance—Building and Equipment.....	43.48			55.45		
Insurance—Liability & Compensation.....	36.70			11.43		
Official Bonds.....	1.90			4.83		
Registration, Dues, etc.....	4.50			2.25		
Printing and Binding.....	28.71					
Freight and Express.....	1.15					
Lumber and Wood Products.....	15.59					



Hand Tools and Minor Equipment...	1,962.50				
Other Supplies.....	.50		9,180.04		2,911.68
<b>Restocking</b>					
Salaries.....	1,226.16				
Repairs to Equipment.....	313.92				
Travel—Employees.....	1,044.69				
Other Contractual Services.....	34.00				
Parts and Fittings.....	146.63				
Gas, Oil, and Lubrication.....	628.73				
Forage and Animal Supplies.....	66.52				
Hand Tools and Minor Equipment...	62.10				
Insurance—Liability & Compensation	5.48				
Other Equipment.....	486.90				
Animals not for Slaughter.....	14,994.20		19,009.33		
<b>Ocala National Forest</b>					
Salaries and Wages.....	6,245.16				
Travel—Employees.....	1,955.00				
Storage.....	8.67		8,208.83		
<b>Avon Park Hunt</b>					
Salaries.....	560.00			280.00	
Repairs to Equipment.....					
Printing and Binding.....	111.50			30.00	
Insurance—Liability & Compensation	.48		671.98	15.83	325.83
<b>Gulf Hammock Hunt</b>					
Salaries and Wages.....	3,802.25			5,839.26	
Printing and Binding.....	410.95			24.00	
Travel—Employees.....	43.57			227.00	
Other Contractual Services.....	325.00				
Parts and Fittings.....	6.20			57.00	
Lumber and Wood Products.....	100.36			207.43	
Other Building Materials.....	57.26				
Stationery and Office Supplies.....	22.25				

# FINANCIAL STATEMENT—Continued

	JULY 1, 1949, TO JUNE 30, 1950			JULY 1, 1950, TO DECEMBER 31, 1950		
	Item Total	Source Total	Total	Item Total	Source Total	Total
<b>GAME MANAGEMENT DIVISION</b> (Continued)						
<b>Gulf Hammock Hunt (Continued)</b>						
Hand Tools and Minor Equipment . . .	5.25			6.00		
Rental of Buildings, Offices, and Land . . .	22.50					
Rental of Equipment . . .	100.00					
Insurance—Liability & Compensation . . .	24.34			9.63		
Repairs to Equipment . . .				22.40		
Gas, Oil and Lubrication . . .				235.67		
Registration, Dues, etc. . .			4,919.93	24.20		6,652.59
<b>Steinhatchee Hunt:</b>						
Salaries . . .				1,945.00		1,945.00
<b>Communications Division</b>						
Salaries and Wages . . .	5,032.00					
Repairs to Equipment . . .	187.46					
Other Fixed Asset Repairs . . .	20.00					
Printing and Binding . . .	6.50					
Telephone and Telegraph . . .	99.51					
Freight and Express . . .	155.61					
Travel—Employees . . .	559.31					
Parts and Fittings . . .	1,321.74					
Other Building Materials . . .	.95					
Fiber and Textile Products . . .	.60					
Gas, Oil, and Lubrication . . .	365.96					
Other Supplies . . .	4.83					
Hand Tools and Minor Equipment . . .	55.17					

Rental of Buildings.....	320.00				
Insurance—Equipment.....	43.48				
Insurance—Liability & Compensation.....	45.48				
Official Bonds.....	3.80				
Registrations, Dues, etc.....	2.25				
Other Equipment.....	2,175.00		10,399.65		
			\$ 1,169,628.56		\$ 698,751.58



### **Conservation Pledge**

I give my pledge  
as an American to save  
and faithfully to defend from  
waste the natural resources of  
my country - its soil and  
minerals. Its forests, waters,  
and wildlife.